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ORIGINAL ARTICLES.

A RÉSUMÉ OF SOME MODERN METHODS OF THE DIAGNOSIS OF DISEASES OF THE STOMACH.

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THERE is in medicine no subject the study of which can be approached with a livelier degree of interest and satisfaction by the clinician than that of diseases of the stomach. Under modern methods of research, these ailments offer an extended range for profitable inquiry, and a scope, the result of exploration, which is not alone of interest to the investigator, as is unfortunately often the case with the familiar organic affections of certain other organs—such, for example, as those of the nervous system. These, though of absorbing satisfaction to follow through their intricacies of diagnosis, are—and probably ever will be—almost a barren field to the therapist. The end for which we gain our knowledge—the cure of disease—is in affections of the stomach less hampered by “the old and inevitable antagonism between pathology and therapeutics” than in ailments of any other viscus.

Recent diagnostic methods, aided by the teaching of the laboratory, not only often enable us to arrive at the nature of the disorder with an astonishing degree of exactness, and to formulate a therapy most successful in result, but they also render it as unnecessary as it is impossible to wait for post-mortem revelations as to the nature of the pathologic process. In diseases of the stomach, in which the workings of a disordered viscus can be studied and compared with the normal, we are enabled to learn so much regarding the pathology of curable diseases, that the reproach, often just, that modern scientific medicine has the tendency to create a greater interest in the study of a disorder than is taken in the patient's well-being, cannot hold here.

The diagnostic methods of inspection, palpation, and percussion, applied to the study of stomach diseases, need not be here detailed, their general application being understood. Regarding palpation, two points, upon which especial stress should be laid, may be noted in passing: (1) that it should always be performed with the hand placed horizon-

tally upon the abdominal wall, and never with it held perpendicularly or obliquely; and (2) that when palpation in dorsal recumbency is resultless, an examination in the knee-elbow and lateral position should not be omitted. It is often necessary that these external methods of examination should be conducted under artificial distention of the stomach, either alone or, conjointly, of the large bowel, with gas or water—or, when the combined method is used, one viscus may be distended with gas, the other with water.

The stomach, more especially its inferior margin, may be outlined when empty and the patient erect, by first noting the lower line of tympanitic note its percussion evokes, if it be possible to thus differentiate transverse colon and stomach. A pint or more of water is now introduced, and if necessary the colon distended with air by a hand-ball syringe, or by the inverted siphon of a bottle of carbonated water. The method of Dehio, a modification of this, is of still greater utility. About a quart of water is introduced in separate quantities of a half-pint each, and after the ingestion of each portion, the lower crescentic limit of flatness against the tympanitic transverse colon is outlined. In the erect posture, though the normal stomach descends somewhat with the increased amount of fluid introduced, it will not quite reach the level of the umbilicus. In cases of relaxed muscularis the descent is more rapid, and in pronounced ectasia and in gastropnoia the stomach is already abnormally low before the introduction of fluid. Another method employed is, with the patient recumbent, to distend the colon with water and the empty stomach with gas, either by generating it *in situ* by the administration separately of the acid and alkaline portions of one or two Seidlitz powders¹ in concentrated solution, or by the introduction of air through a stomach-tube by an ordinary enema-syringe. The former is a more rapid method of obtaining distention, but often not quite so satisfactory in result when applied in cases of decided gastrectasia.

Among the newer methods of exploration must be mentioned gastrodiaphany of Einhorn.² With this, valuable aid may be obtained in outlining the

¹ A teaspoonful or two of sodium bicarbonate and about two-thirds this quantity of tartaric acid may be used to replace the Seidlitz powder.

² See the New Yorker med. Monatsch., November, 1889; the New York Med. Journ., December 3, 1892.

¹ Gowers: Syphilis and the Nervous System.

size, situation of the stomach, and, in certain cases, the condition of the anterior gastric wall. Einhorn's gastrodiaaphane, made by Reynder & Co., of New York, consists of a soft stomach-tube, at the gastric extremity of which is placed an Edison's hard-glass lamp, from which conducting wires, containing a current-interrupter, run to a portable storage-battery. This apparatus, which is really very practicable, is as easy of introduction and manipulation as the ordinary stomach-tube. In its application the stomach should be free from food and moderately distended with water.¹ When considerable faucial irritability exists a cocaine solution should be first applied to the throat.² The stomach extremity of the gastrodiaaphane, after being lubricated with oil or glycerin, is guided over and past the epiglottis by the index-finger of the left hand, much as a hard tube is introduced. After its passage, the circuit is closed. If no pronounced thickening of the anterior stomach-wall exists, trans-illumination in a dark room, with the patient erect, permits the outlines of the stomach to be seen as a zone of reddish hue on the abdominal wall.

The actual utility of gastrodiaaphany over other methods of outlining the stomach lies especially in the application of the diaphanoscope to the differentiation of gastroptosis from gastrectasia, as by it the determination of the site of the lesser curvature is far more readily made than by inflation. It also is of real value in diagnosing tumors or thickening of the anterior wall of the stomach, the presence of these interfering with trans-illumination.³

The most notable of the advances made in the diagnosis and treatment of diseases of the stomach dates from the application of the stomach-tube to diagnostic purposes by Leube, in 1871, and the subsequent introduction of the soft tube by Ewald, for similar uses. An insight was thus obtained better than ever before as to the gastric chemism, and extraordinary opportunity given not only to study its derangements in various phases, but for experimental research leading to a rational therapy. The time has now, indeed, arrived in which it may be not rashly asserted that one might as readily

attempt to diagnosticate a grave kidney-derangement without an examination of the urine, as some of the common gastric ailments, without at least a cursory study of the secretory condition of the diseased stomach. Beyond doubt, less hazard will result from such empiricism applied to the management of derangements of the kidney than to that of those of the stomach, the constant disorder of which may be regarded as *fons et origo* of many of the chronic ills that appear with increasing years. Fortunately, the use of the tube for diagnostic purposes, and the subsequent examination of the removed stomach-contents, require so little special skill that these are the reach of even the medical tyro.

The best form of stomach-tube is that of Ewald. This is of moderately soft red rubber, of open and somewhat tapering tip. It has in the lateral walls one large fenestra, and a number of smaller ones.¹

The tube of Ewald, as sold, is of insufficient length for lavage. When used for this purpose, a second portion of gum tubing must be joined by the interposition of a small section of glass piping. For a mere removal of the stomach-contents the length is ample without the second piece of tube, except in cases of gastrectasis.

So important an adjuvant to diagnosis and treatment is the tube, that I consider it almost impossible to do justice to a case of pronounced chronic gastric disorder without a resort to it in some stage of the disease. So helpful is it in arriving at a correct diagnosis, and in directing the therapy, apart from its utility for lavage, that the earlier a patient can become habituated to its employment the better. I now rarely treat a case without it, and as rarely encounter one that will not willingly consent to its use for diagnostic purposes and treatment, when its utility is explained. But a few introductions of the tube are required—the throat cocaine-ized² at first, if necessary, and the intervals not too

¹ The inner edge of the large opening in the lateral wall should be bevelled. Even with the 11 mm. tube, the full size, I often have had difficulty in removing the stomach-contents after a general meal, in which imperfect solution of the food has occurred. Large portions of mucus alone will sometimes block both the tip and lateral fenestrae. Cheaper, softer tubes than Ewald's are generally sold in this country. These are of red rubber, about 60 inches in length. They have an open tip, and a fenestra in the lateral wall. Their other extremity is made funnel-shaped.

² A small quantity of a low percentage of cocaine (about 3 to 4) is projected with a medicine-dropper upon the posterior pharyngeal wall, shortly before the tube is passed. I always make use of cocaine in this way, especially in women, the first two or three times. Subsequently cocaine may be dispensed with. The gummy smell of the tube, after introduction, is offensive to some, and may in itself produce nausea. A few drops of mentholated oil snuffed into the nostrils disguises this. After a few introductions the odor is no longer objectionable. After cocaineizing the throat the stomach extremity of the tube is rapidly

¹ Einhorn advises from one-half to one pint. Heryng and Reichmann (*Therapeutische Monatshefte*, March, 1892), who have recently investigated gastrodiaaphany with a special apparatus of their own, find that the most satisfactory results are obtained when the stomach is filled with water. They use, according to the degree of dilatation, from 500 to 2000 c.cm. My own experiments with Einhorn's gastrodiaaphane have given me much better results when the stomach was distended with water.

² As it is usual to examine the gastric contents in cases in which diaphanoscopy is indicated, the patient has probably become somewhat accustomed to the application of the soft tube. This I regard desirable when it can be arranged, as nervousness and gastric irritability will not then disturb the examination.

³ Einhorn relates a case of probable diffuse carcinoma, in which the diagnosis was so established.

lengthy—before the patient will most readily manipulate it totally without inconvenience, and always, in selected cases, with benefit.

The stomach-contents are more readily removed with less disturbance to the patient by aspiration than by the expression method of Ewald, now commonly recommended. The latter is often difficult of successful application in uneducated cases, and is, moreover, annoying to the patient. Frequently, also, by it the entire stomach-contents cannot be removed, so necessary for a complete examination when a small meal, such as a trial-breakfast, has been taken. There is also likelihood of a reflux from the duodenum of alkaline juices in cases of relaxed pylorus, when straining efforts of evacuation are made, besides the actual danger of hemorrhage in cases of unsuspected ulcer. I now invariably use for aspiration a simple apparatus, which can be readily made by anyone. It consists of a wide-mouth bottle of moderate capacity, with a rubber stopper containing two perforations, holding glass tubes, the outer extremities of which are bent at a right angle; to these are attached the stomach-sound and a simple rubber bulb, or, preferably to the last, an ordinary enema syringe, minus its metal or hard-rubber extremity. With the bulb or syringe a rapid exhaust of air in the bottle is produced, the latter being held below the stomach-level. A prompt inflow of gastric contents then usually promptly occurs without gastric disturbance. Should the flow not occur promptly, or, having begun, have ceased, the intra-gastric extremity of the tube being at the fundus, the exhaust syringe should be reversed, and several bulbfuls of air pumped into the stomach. Thus, any food particles or masses of mucus which may have blocked the fenestræ will be dislodged. The syringe is then reversed and the aspiration completed. The bottle, stopped with an ordinary cork, serves to transport the stomach-contents, should the aspiration have been done away from the place of examination.

Many and careful studies of the gastric secretory function during fasting and in various periods of digestion, first undertaken by Ewald and Boas, and subsequently pursued by many others, with results in the main confirmatory of those obtained by the former, have shown that normally during fasting the stomach contains no digestive secretion;¹ and that after food,

passed toward the pharynx, the patient being directed to swallow as it engages in the latter. With one or two efforts at deglutition the tube can then usually be pushed rapidly onward until it reaches the stomach's fundus. It is unnecessary to introduce the finger into the mouth in passing the soft tube, guidance past the epiglottis not being required. The whole maneuver, introduction of tube and siphonage, can be accomplished usually in a few seconds.

¹ Apparent exceptions to this exist only in those in whom manipulation excites a flow of gastric juice, or, in cases of hyper-

certain definite stages of digestion occur, during which, with very similar quantity and character of aliment, similar intra-gastric conditions will be encountered, and that if broad deviations occur from these an abnormality is indicated. A variety of trial-meals have been suggested to ascertain this, such as Ewald's, Leube and Riegel's, Reichmann's, and Jaworski's,¹ any one of which resorted to, must invariably be ingested on an empty stomach. Whichever is selected, it is desirable that that one only should be habitually used, as different varieties and quantities of food do not stimulate the secretory function equally.

The stomach-contents should be removed at a time when digestion is normally at its height, which occurs after Ewald's breakfast in from three-quarters of an hour to one hour; after Riegel's meal in from three to five hours, and in about one and a half hours after Reichmann's.

During the early stage of the digestive phase the acidity of the gastric contents is feeble, due to acid salts of the ingesta, and to lactic acid, the latter derived either from the lactates in the food or from fermentation of carbohydrates. In this stage, varying from twenty minutes to two or more hours, depending upon the amount and character of the ingesta, saccharification of starch, begun in the mouth, occurs, and continues so long as the acidity due to organic acids and acid phosphates remains at a minimum. The second stage is characterized by the appearance of uncombined HCl, after complete saturation by the latter of organic bases and albuminoids.² Free HCl now gradually increases in amount until the normal percentage—0.15 to 0.3³—is reached, while lactic acid and acid salts coincidentally diminish, and finally disappear,

secretion, in which, during fasting, the stomach often contains more or less gastric juice, the acidity of which is often higher than that of the normal.

¹ That in common use is Ewald's, consisting of a well-cooked stale roll (or 35 to 70 grams of stale white bread), without butter, and 300 c.cm. of water, or an equal quantity of weak tea without milk or sugar.

Leube and Riegel's dinner, of which the other trial-meals are modifications, consists of 400 c.cm. of soup; 60 or more grams of scraped beef; 50 grams of white bread, and 200 c.cm. of water. It is less convenient of administration than Ewald's, and is likely to be much more difficult of removal than the others, when digestion is retarded.

Reichmann's breakfast consists of 30 grams of meat-powder; 2 grams of salt; 200 c.cm. water, and one wheaten roll.

Jaworski uses the whites of two hard-boiled eggs, and 100 c.cm. of water.

² By free HCl is meant that not united as a salt with the organic bases of the ingesta, or loosely combined with the albuminoids. The latter represents the bound or united HCl, not detectable by qualitative tests. See my paper in Hare's System of Therapeutics, vol. ii, p. 890.

³ 0.3 per cent. of free HCl is often present physiologically at the height of digestion of a full meal.

except in traces too minute to be appreciable by ordinary tests.

After a light meal, such as Ewald's trial-breakfast, the reaction for free HCl is usually manifest to ordinary tests in from twenty to forty-five minutes, and at the latter period in the percentage stated. At the height of digestion of a more varied meal the percentage of free HCl may be even greater than this normally; and contrarily, in diseased conditions may also be much less, depending upon the readiness with which the secretory function responds to increased stimulation. The reaction for starch is then normally absent, but that for erythrodextrin and grape-sugar is decided. Tests for ordinary albumin also result negatively, while, contrary to what is ordinarily regarded as the rule, there is an abundance of proteoses, but traces only of peptone, if present at all. The formation of abundant proteoses (albumoses) indicates sufficiently the presence of pepsin, while the existence of lab-ferment is evinced by the ability of the filtrate of the removed contents to solidify milk.

A systematic examination of the gastric secretion is best conducted as follows:¹ The stomach-contents, removed at the time already specified, are carefully inspected as to the presence of blood, bile, mucus, and evidences of solution of food. It is now subjected to thorough agitation in a small vial, preceding filtration, if the latter is practised, as it has been ascertained that different portions of the filtrate are sometimes of varying acidity.² Examination should be made as early as possible after removal of the contents, that further digestion or fermentative processes may not ensue, perhaps resulting in disappearance of the free HCl present.

The acidity is first ascertained by litmus or Congo paper.³ Congo paper may be first used, since, because of its reacting to free acids and abnormal amounts of acid salts, rendering blue or violet the former and weakly browning the latter, a positive response

obviates the use of litmus, and often gives valuable preliminary testimony.

The total acidity—that due to free acids and acid salts—is now determined. Ten c.cm. of the stomach-contents are titrated with a deci-normal solution of sodium hydrate,¹ a drop or two of a weak alcoholic solution of phenol-phthalein being first added as the indicator. A persistent, very faint red tinge shows neutralization. The total acidity is calculated on 100 c.cm. of stomach-contents. One hour after Ewald's trial-breakfast this should be between 20 and 60, equaling an acidity which, if due to HCl alone, would represent 0.07 and 0.21 per cent.

The presence of acid salts or free acids, may be determined by Congo paper as already stated, but, more delicately, by Leo's CaCO₃ test. A few drops of the filtrate are thoroughly mixed in a watch-glass with a little dry powdered CaCO₃ (C. P.).² After complete neutralization of the free acids of the filtrate, and disappearance of dissociated CO₂, the reaction is taken with blue litmus paper and carefully compared with that of the original unneutralized filtrate. A simple lessening of red coloration shows the presence of both free acids and acid salts. Its total disappearance indicates positive absence of acid salts.

In examining for free HCl only those tests should be employed which respond to a mineral acid. For this reason Congo, methyl-violet, benzo-purpurin, 6 B., tropeolin (oo), and other similar color reagents and combinations are not to be preferred to Günzburg's or Boas's³ solution. Of these last, Günzburg's solution is a trifle more delicate; and as it may also be employed for the quantitative

¹ Lack of space prevents the subject being here considered other than in outline. It is, however, sufficiently detailed for practical clinical purposes.

² See "Die Magensaure des Menschen," Martius and Lüttke. For this reason it is advisable to make quantitative examination for HCl and for the acidity, without filtration. When filtration is practised, thorough agitation should first be made. I have recently applied the centrifugal machine used for prompt separation of precipitates in urine, for quickly obtaining the fluid portion of the stomach-contents, after thorough shaking to insure an equable mixture.

³ Congo paper is more convenient for use than Congo solution, though also much less delicate in response to free acids. Of the solution, a droplet added to a drop or so of the gastric filtrate, develops a violet or blue coloration depending upon the amount of free acid present—violet, if a minimum. 0.001 HCl and 0.002 lactic acid in aqueous solution are thus shown with certainty. With Congo paper but 0.01 HCl and 0.03 lactic acid respond to similar solution. See Leo: Diagnostik der Krankheiten der Verdauungsorgane, p. 92.

¹ $\frac{N}{10}$ NaHO = 4 grams NaHO dissolved in 1000 c.cm. distilled water. Each c.cm. of this solution exactly neutralizes 0.0036 grams absolute HCl. The number of c.cms. consumed in the titration, multiplied by 0.0036, would represent the percentage of HCl contained in 100 c.cm. of the gastric filtrate, if the only acid present were HCl. The titrating solution is slowly dropped, with constant stirring, from a burette graduated in one-tenths of c.cm.

² CaCO₃ in cold solution neutralizes free acids only, not reacting with acid salts. This test is very delicate. Its application, after removal of fatty acids by heat, and lactic acid by agitation with ether, is the most certain and sensitive test known for free HCl. According to Leo, 0.002 per cent. of the latter may be detected by it if decided amounts of acid phosphates are not present; even then 0.008 per cent. HCl may be shown with exactness.

³ Günzburg's solution spoils more readily than Boas's. It should be prepared only in small quantities, and kept in a black, tightly-stopped bottle. Boas's solution consists of re-sublimed resorcin (5), sugar (3), dilute alcohol (100). Its application is identical with that of Günzburg's. Should response to Congo paper not occur, it may be necessary to gently evaporate several drops of the filtrate to obtain a reaction with these tests, and then but a fleeting red at the circumference may be produced, denoting minute traces only of free HCl. For percentage of delicacy of response of these tests and interference therewith in other solutions than aqueous, see my paper, Hare's System of Therapeutics, ii, pp. 897, 898; and Leo, loc. cit., p. 98 et seq.

determination of free HCl (Mintz method) it is to be selected. Günzburg's solution consists of 1 part of vanillin, 2 of phloroglucin, and 30 of absolute alcohol. One or two drops of the gastric filtrate, with one of the test-reagents, are gently heated over an alcohol or Bunsen flame on a porcelain dish. On slight evaporation, a delicate rose-red tinge appears at the margin of the liquid, and promptly becomes of an intense cherry-red, depositing minute crystals of a similar color in the presence of decided amounts of free HCl. With the usual percentage of free HCl present, one drop of gastric filtrate may be diluted upward of fifteen times, and yet a drop of this dilution will be found to respond to freshly made Günzburg's solution.

Freshly prepared Günzburg's solution forms an easily applied quantitative test (Mintz's)¹ for free HCl which is sufficiently exact for clinical purposes. Ten c.cm. of the filtered or unfiltered stomach-contents are carefully titrated with deci-normal soda solution from a burette until a response no longer occurs with Günzburg's reagent. With the addition of each $\frac{1}{10}$ c.cm. or fraction thereof, depending upon the amount of free HCl suspected to be present, a drop or two of the partly neutralized contents is tested with Günzburg's solution.² The limit of the Günzburg's reaction, being approximately 0.036 pro mille of HCl, an estimation of the percentage of free HCl is made by the multiplication of the number of c.cm. and fraction thereof at which the response just ceases, by 0.0036.

*Examination for organic acids—lactic and fatty.*³

—Lactic acid is detected by the addition of a few drops of the gastric filtrate to Uffelmann's carbolated ferric chlorid solution,⁴ or to a very dilute solution of ferric chlorid⁵ alone, in a test-tube; the amethyst-blue color of the former solution is at once

transformed into a yellow, and the light, almost colorless, yellow of the latter will be intensified in the presence of traces of lactic acid. Unfortunately, glucose, acid salts, and lactates also respond to the carbolated ferric chlorid test, and lactates and peptone to its modification, the ferric chlorid. A positive reaction occurring, therefore, a second step is necessary. A small quantity of the filtrate—about a dram—should be thoroughly agitated in a test-tube or separating funnel with about three or four times this amount of neutral ether. When great delicacy of result is especially desirable, as in removing all traces of lactic acid prior to testing for free HCl by calcium carbonate, several fresh portions of ether should be used. The ether is on each occasion removed by a pipette, if a separating funnel has not been employed for agitation. It is subsequently evaporated on a capacious watch-glass or porcelain dish, on a water-bath or in the air, and an aqueous solution of the ethereal extract tested by Uffelmann's solution, which with these precautions becomes the most delicate reagent for the detection of lactic acid.

The fatty acids may be very simply detected by heating to the boiling-point a few c.cm. of the filtrate in a test-tube, over the mouth of which is suspended a strip of moistened neutral or blue litmus paper. Traces of these acids may be thus recognized.

The presence of free HCl indicates, beyond doubt, also the presence of pepsin. In the absence of response to tests for the former, the presence of the milk-curdling ferment also signifies the existence of pepsin. Response to the digestive test is also a certain indication of the secretion of both pepsin and HCl. A small disc of hard-boiled white of egg, or a similar quantity of purified blood-fibrin¹ is placed in one or two drams of the filtrate in an incubator maintained at a temperature of about 100° F. The albumen should be dissolved in from one to three hours, if pepsin and the normal percentage of HCl are present. If absence of or a deficiency in HCl exists, this acid should be added until, roughly, a percentage of from 0.1 to 0.3 is reached.

The presence of proteoses (albumoses or propeptones) also indicates the presence of peptone, for, although HCl alone apparently possesses the power to form a small amount of proto-albumose as well as syntonin, its secretion without the coincident appearance of pepsin seems impossible.

Until recently it was thought that peptone was formed in abundance in the stomach, as a result of pepsin-HCl digestion, and that this, indeed, was the true end-product of the same. The researches

¹ Mintz: Wiener klin. Woch., 1889, No. 20; 1891, No. 9; and Martius and Lüttke's Die Magensaure des Menschen, pp. 90, 91.

² If Mintz's test is applied after the total acidity is reckoned, and an account has been taken of organic acids and acid salts, an approximate idea may be formed of the quantity of soda solution required, so that too frequent repetition of application of Günzburg's test may be avoided during titration. If, however, only a small quantity of stomach-contents is obtainable, the test may be at once applied in the manner directed to the 10 c.cm. from which the total acidity is calculated, great care being then observed in the addition of the neutralizing solution.

³ Space does not here permit detail of methods for estimating both the combined and free HCl, less necessary of calculation than the latter alone. Unfortunately, of the many proposed and in use, none is without elements of fallacy; those that are regarded as freest from error, and which I usually employ, are Salkowski's modification of Sjöqvist's method (Zeitschrift f. physiolog. Chem., 1888; Bd. 13) and Leo's (see his Diagnostik, etc. or Martius and Lüttke's Magensaure).

⁴ A dilute solution of neutral iron chlorid containing a drop of carbolic acid.

⁵ So dilute as to be almost colorless. For comparison of result, a second test-tube is filled with a similar solution to which an equal quantity of water is added, as of filtrate to the first. The colors of the two are carefully compared.

¹ Blood-clot is repeatedly washed until all trace of blood-coloration is removed. It is then preserved in glycerin, which latter is first removed from the test-portion used, by repeated washings.

of Kühne and Chittenden¹ tend to indicate that this is not the case; that but a minimum amount of true peptone is actually formed even through the long-continued action of pepsin-acid.² Bodies intermediate between syntonin and peptone seem to be largely the actual final product of peptic digestion, if one may judge by the relative amount of these and of peptone formed. The proteoses or albumoses are at least three, pro-albumose, hetero-albumose, and deutero-albumose; each of which in the order named progressively approaches peptone. After neutralization of the acid filtrate, which precipitates syntonin or acid-albumin, and the removal of the latter, it had been thought, until Kühne and Chittenden's observations showed the contrary, that the primary products of digestion could be removed by the addition of sodium chlorid and strong acetic acid. Recently these experimenters ascertained that at least deutero-albumose is not thus precipitated, and that even proto-albumose and hetero-albumose are incompletely precipitated unless the sodium chlorid be present to saturation—so that the body termed "peptone" in the past has been variously deuteroproteose alone or a mixture of the proteoses, or of proteoses and peptone.

At the height of normal gastric digestion, one hour after Ewald's trial-breakfast, little or no cloudiness should occur on boiling and on neutralization of the gastric filtrate, showing absence of undigested albumin and of syntonin. These, if present, are removed by filtration. The colorless filtrate may then be at once acted upon by neutral ammonium sulphate, which in hot saturated solution almost entirely removes all traces of the proteoses; or, the filtrate may be first treated with cold saturated solution of sodium chlorid and strong acetic acid, which precipitates proto-albumose and hetero-albumose. Finally, deutero-albumose and traces of the other albumoses remaining may be precipitated by saturating the neutralized filtrate while hot with ammonium sulphate. The resulting ammonium sulphate filtrate should then be examined for peptone by the biuret test.³

In a considerable number of tests for peptone so applied, at the height of gastric digestion, my experiments are confirmatory of the test-tube experiments of Kühne and Chittenden. I have, indeed, rarely found more than traces of peptone, and fre-

quently have been unable to obtain the biuret reaction in subjects in whom the digestive secretion otherwise responded normally. In these, proteoses were present in abundance, with no traces of undigested albumin and but little syntonin.

The presence of the milk-curdling ferment—an enzyme apart from pepsin and not related to HCl⁴—is readily ascertained by the addition of a few drops of gastric filtrate to about a dram of unboiled milk; this placed in a warm chamber solidifies in from a few minutes to an hour.⁵

Starch is readily detected in the stomach-contents by the blue coloration resulting when the filtrate is tested with Lugol's solution. The presence of erythrodextrin, a primary stage in the conversion of starch into maltose, is shown by a purple or brown hue developed. Achrodextrose, maltose, and dextrose, more advanced stages of the hydrolysis of starch, do not react to solutions of iodine. It is useless to test for grape-sugar, as this preëxists in the roll eaten.

The estimation of the propulsive functions of the stomach is of great diagnostic, prognostic, and therapeutic importance. It is most conveniently tested by salol, the method of Ewald and Sievers. This method furnishes fairly accurate results and is readily applied,⁶ unlike the method, proposed by Klemperer, with oil. It is, however, unfortunate that hyperacidity due to increased secretion of HCl, which often occasions and accompanies gastric hypermotility, may cause delay in the intestinal decomposition of salol, and thus mislead, the result of the test suggesting the reverse condition—hypomotility. Therefore, in instances of hyperacidity with delay in salicyluric acid response, in which a study of the propulsive function is of importance, Leube's method also should be tried—that of washing out the stomach and inspecting the removed contents for food elements from six to seven hours after a trial-dinner, or two hours and a half after Ewald's trial-breakfast, at the expiration

¹ The characteristic solidification of milk under the action of the ferment rennin must not be confounded with the fine, flaky coagula resulting from acids.

² Should coagulation not occur at the expiration of the specified time, rennin is probably absent, though its pro-enzyme, labzymogen, may not be. A small quantity of concentrated solution of CaCl₂ is added to the mixture, which is again placed in a warm chamber. Solidification now resulting indicates the existence of labzymogen, which, through the action of the CaCl₂ added, generating HCl, is transformed into the active ferment.

³ Fifteen grains of salol in water are administered shortly after an ordinary meal. The urine is tested for salicyluric acid, beginning half an hour after the ingestion of the dose, and continued at intervals of from fifteen to twenty minutes, until response occurs. A simple method is to moisten strips of filter paper with a few drops of urine, touching the moistened spot with a few drops of a 20 per cent. solution of iron chlorid. A violet color indicates the presence of even traces of salicyluric acid. This reaction occurs normally in from forty to seventy-five minutes.

¹ See Chittenden: "On the Relative Formation of Proteoses and Peptones in Gastric Digestion." *Journ. of Phys.*, vol. xii, No. 1.

² Unlike what occurs in consequence of pancreatic digestion of albuminoids, as a result of which peptone is readily formed without the intermediate albumose stages.

³ The filtrate should be treated with a sufficient quantity of a strong potassium hydrate solution to decompose all ammonium sulphate present (see Chittenden, loc. cit.). Succeeding this, a drop or two of a very weak cupric sulphate solution should be added. The presence of peptone is shown by a purple-red color, varying to bluish-violet, depending upon the amount present.

of which period the stomach should be empty. The condition of the absorbent function of the stomach, of much less importance than the propulsive or secretory, is ascertained by the method of Penzoldt and Faber. Two or three grains of potassium iodid, inclosed in a gelatin capsule, the exterior of which must contain no traces of the salt, are ingested with a little water, on an empty stomach.¹ Normally, rapid absorption of the iodid from the stomach occurs, iodine being detected in the saliva in from six to fifteen minutes. Strips of starch-paper² are moistened with the saliva and then a drop of fuming nitric acid is added to the moistened spot—a bluish coloration shows the presence of iodine.

Of the three gastric functions the trend of opinion recently is toward regarding the propulsive as the most important. Diminution in it, however perfect the gastric chemism, is likely to lead to impaired nutrition and secondary secretory disturbance far more promptly and more frequently than is a mere diminution in chemism to affect gastric motility. The chief function of gastric digestion is that of peptonization of proteids, and yet, as has just been stated, true soluble diffusible peptone is, under the most favorable circumstances, formed to a very limited extent in the stomach, bodies intermediate between it and acid-albumin being largely the end-products of pepsin-HCl digestion. These are but slightly absorbable, dialyzing and diffusing with difficulty. Subsequently, through tryptic digestion, the proteoses are converted into soluble peptone. Carbohydrates, save that portion acted upon by the saliva and fats, are also subject to intestinal digestion. Milk is coagulated and subsequently partly peptonized in the stomach; but since a milk-curdling ferment is also secreted by the pancreas, the stomach may be said to possess no digestive function not existing in the pancreatic juice.

Proteolysis, the chief digestive function of the stomach, is so much more efficiently performed by the pancreatic juice, which also readily digests starches and fats, that the gastric secretory functions may be in entire abeyance for long periods, and almost perfect bodily nutrition maintained by duodenal digestion, provided the gastric motility remains normal. It must, however, be borne in mind that derangement of the secretory apparatus tends, as a rule, if prolonged, to lead to atony of the stomach, and this eventually to a catarrhal condition which may eventuate in atrophy of the gastric tubules. In this condition degeneration of the gastric muscle is likely to occur.³

The various disorders affecting the stomach are characterized by an alteration in one or all of the functions, the recognition of the condition of which has just been considered. Derangement of gastric chemism is the most common. The secretory alteration consists especially in either diminution or increase in the most important of the constituents of the gastric juice—hydrochloric acid. Diminution is usually accompanied by a lessening in the production of pepsin and rennet ferment, though these latter or their pro-enzymes¹ are never habitually absent from the gastric secretion, except in advanced atrophy of the mucosa, in which condition the secretory function is, of course, totally in abeyance. Unlike the case with secretion of pepsin and rennet ferment, free HCl may be completely unrecognizable in various affections, such as carcinoma of the stomach,² and less often, though more frequently than is commonly supposed, in certain gastric disorders depending upon a neurosis and of reflex origin.

Diminution or even absence of HCl in the stomach sometimes occurs solely as a neurosis, in the hysterical and neurasthenic, and as a reflex gastric disturbance in many uterine disorders and during menstruation. Cases are also rarely encountered in which, with presumably a normal mucosa, and without evidences of ailments affecting the stomach reflexly, in which free HCl is much diminished or absent. Diminution in secretion of HCl also attends all acute febrile conditions, acute or chronic gastric catarrh,³ whether primary or secondary to heart, lung, or other visceral disease, or to gastric dilatation.

observation for a year and a half. Einhorn (Med. Record, June 11, 1892) reports four cases of so-called atrophy of the stomach—but for which he suggests the term *achylia gastrica*—under his notice for several years. Three of these remain well nourished. One is a robust male, aged forty years, in whom Einhorn believes the anacidity has probably existed from earliest youth.

¹ Pepsin and rennin probably do not exist in the secreting cells as active ferments, but as pro-enzymes, which are subsequently converted into the former by the action of certain substances, such as common salt and HCl.

² Absence of free HCl in carcinoma of the stomach results from disturbance in the secretory function, originated in all probability by an accompanying gastritis, leading to generalized atrophy of the mucosa. Rarely, free HCl persists until death, despite the presence of carcinoma, and very exceptionally, especially in carcinoma originating from ulcer, free HCl is present in excess. In these cases the gastric mucous membrane, except in the immediate vicinity of the cancer, has been found normal, *post-mortem*.

³ An apparent exception exists in cases of hypersecretion of HCl, in which a catarrhal condition of the mucosa may be produced by irritation of the highly acid gastric juice. This continuing, chronic gastritis with subacidity ultimately results. Occasionally, also, in cases of simple mucous catarrh in which probably no structural alteration in the specific secretory epithelium has yet eventuated, periods of plus secretion in HCl replace diminution in the same. This last, though contrary to the teaching of Ewald, is based on positive evidence in cases that I have carefully studied.

¹ For more detailed account of estimating gastric motility see my paper in Hare's System of Therapeutics, vol. ii, p. 900 et seq.

² Filter-paper saturated with starch paste, and dried.

³ Cases of this sort are not uncommon, though few have been reported, except in Germany. I have had one—a woman—under

Diminution in, or absence of, secretion of HCl is often accompanied by the presence of large amounts of organic acids and acid salts in the stomach; especially is this the case if lessened gastric motility permits undue retention of food; so that in chronic gastric catarrh and in gastrectasia, however arising, these acids are usually found in abundance at a stage of digestion in which free HCl should be the only acid detectable by tests commonly employed.

Hyperacidity of the stomach may be due to the undue presence of organic acids arising through fermentation of food. This condition is often encountered in gastric catarrh, dilatation, and carcinoma. Hyperacidity more commonly occurs as a neurosis, it being then due to the presence of an excessive amount of free HCl, in which condition organic acids are at a minimum. Hyper-HCl production may or may not be accompanied by hypersecretion. When the latter is present, many ounces of an active digestive fluid may be obtained from the fasting stomach, even when little or no manipulation has been used in its extraction. Hypersecretion of gastric juice may or may not be accompanied by hyperacidity, though it usually is. It occurs either continuously, in which condition many ounces may be obtained from the fasting stomach, or periodically, and then especially after the ingestion of food.

SYMPHYSIOTOMY VERSUS ITS SUBSTITUTES; WITH THE REPORT OF A CASE OF SYMPHYSIOTOMY.¹

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THE revival of symphysiotomy is due to the genius of Morisani, of Naples; its introduction into the United States, to our distinguished Fellow, Dr. Robert P. Harris. Now that the results of symphysiotomy are known, as accomplished by the operation done under modern aseptic methods, the wonder is that the profession could have been blinded by the prejudices of the past, arising out of the comparative failure of the operation when done without regard to a knowledge of scientific obstetrics or surgery.

The results obtained by Italian operators under the influence of Morisani's teachings took the world by surprise. The fact that the work was being done was well known, but the profession was supercilious and refused to estimate it in a scientific spirit. The old, prejudiced belief that symphysiotomy was necessarily a failure, because it did not permit of an increase in the conjugate diameter of the pelvis, and because it jeopardized the integrity of the pelvic symphyses,

was too firmly grounded to be easily set aside, and it required the demonstration of the safe delivery of thirty women, in Italy, having contracted pelves of marked type, before any but Italian surgeons were willing to perform the operation.

The old objections to the operation were: 1. That in contracted pelves, as a rule, the antero-posterior diameter is the shortened diameter; and that this diameter is scarcely, if at all, increased by the operation. 2. That there is great danger of rupture of the sacro-iliac symphyses. 3. That the symphysis pubis would not unite properly; and hence that the powers of locomotion in women subjected to the operation would be greatly lessened. Experience has shown each of these objections to be groundless or much overstated. Undoubtedly the oblique and transverse diameters of the pelvis are increased more than the antero-posterior, but this diameter also is increased. When the pelvic bones are separated from two to two and a half inches, enough room is afforded for the rounded head (perhaps the parietal protuberance) to project into the opening, thus increasing the working space at least half an inch. This increase in space, together with the increase in the oblique diameters, affords the necessary room for delivery, except in cases of very marked deformity.

The objection that the sacro-iliac joints may be ruptured has not been borne out by experience. Nevertheless it should not be forgotten that at times the pelvic joints are ruptured in cases of difficult labor in which symphysiotomy has not been done. This should admonish surgeons to be careful in recommending the operation in cases of marked deformity, especially if the head of the child seems large and well ossified.

The final objection, that the divided symphysis would not unite, is likewise not well founded, as experience has demonstrated that it unites with pleasing uniformity and facility.

Since January 8, 1886, there have been fifty-seven symphysiotomies, and all the women have recovered, except one. This woman (case of Martino, September 22, 1886) had been in labor several days when operated upon, and died of metro-peritonitis, due to infection of the birth-canal, and not to the operation. This fact justifies the conclusion that in proper cases when done early, and after the antiseptic method, symphysiotomy has no mortality. This is true, however, only under the conditions laid down. The history of the operation admonishes us that when done on improper cases, and without asepsis, its mortality is high.

The complications following the operation have been urethral and vesical fistulæ in a few cases. According to Morisani, these were due to a faulty technique. Not having had the opportunity myself to study the recorded cases of symphysiotomy, to

¹ Read before the College of Physicians of Philadelphia, Feb. 1, 1893.

discover accidents resulting from it, I wrote to Dr. Harris, who has recently studied the literature in the preparation of his paper on the subject (*Trans. Amer. Gynecological Society*, 1892). He writes me that since the perfection of the technique, in 1886, there is no case recorded in which the sacro-iliac joints have been injured; no case in which a child has been delivered absolutely dead; and no case in which it was necessary to practise embryotomy to complete the delivery. Even going back to 1866, in 125 symphysiotomies there is but one case recorded of possible injury to the sacro-iliac joint. This was a case of iliac phlegmon, which is by no means necessarily due to joint-injury.

The results to the children delivered by symphysiotomy have been equally good. No child has been born absolutely dead, but six children out of fifty-seven died shortly after birth.

Having thus disposed of the questions heretofore raised concerning the operation, it remains to consider its true field of usefulness and its relation to Cesarean section, the induction of premature labor, and to embryotomy.

The operation has been done, heretofore, principally in cases of flat pelvis, and the measurements hereafter given refer to that deformity. Other varieties of deformity are rare, but fortunately the operation is even better adapted in them to facilitate delivery, excepting cases of Naegele or Robert pelvis.

The conjugate diameter in the women heretofore operated upon has varied from 66 mm. ($2\frac{5}{8}$ in.) to 97 mm. ($3\frac{1}{8}$ in.). There is a general agreement among surgeons to limit the field of symphysiotomy in flat pelvis to cases having at least $2\frac{3}{4}$ inches in the conjugate diameter. I find myself in agreement with this opinion. My own experience in delivering a child weighing eight pounds and two ounces through a pelvis of $2\frac{3}{4}$ inches has admonished me that less room would entail very great danger of death to the child, and would put more strain on the sacro-iliac joints than would be judicious.

In this field symphysiotomy comes directly into competition with the Cesarean operation, done for the relative indication. I am convinced of the beneficent nature of the modern Cesarean operation, when done *secundum artem*, and that it has a very low if not a *nil* mortality in the hands of an expert. Nevertheless, it must be acknowledged that the Cesarean operation is a more formidable operation than symphysiotomy, and that its possibilities of morbidity and mortality are undoubtedly greater. Hence I unhesitatingly pronounce in favor of symphysiotomy in this field, and believe that it will soon supplant the Cesarean operation performed for the relative indication. Aside from its absolute claims for preference, there are several relative claims which I believe will prove of great service in practice. The

practitioner will not have to overcome a popular prejudice, as is the case with the Cesarean operation. Symphysiotomy is to the public a new operation; hence the public is prepared to estimate its risks as presented by the profession. This is not true of the Cesarean operation, for the modern operation has to bear the evil name of the old operation, and is believed by the public to be almost necessarily fatal. These considerations will render it more easy to gain consent for the performance of symphysiotomy than it has been for the Cesarean section. Another advantage will be that the failure of the natural forces, assisted by art, to accomplish delivery, will prove a convincing argument in favor of the necessity for symphysiotomy. And, happily, the operation can then be done with success, whereas, in the case of the Cesarean operation the favorable time would already have passed by.

Symphysiotomy likewise fills the field heretofore occupied by embryotomy done on the living child. Since the perfection of the technique of the Cesarean operation, in common with many others, I have denied the justifiability of embryotomy done on the living child. With the addition of symphysiotomy to scientific obstetrics I believe that the slaughter of the innocents will cease. The old excuse for embryotomy, that it is justifiable to kill the child to save the mother, no longer holds, for both can be saved either by the Cesarean operation or by symphysiotomy. As I have recently discussed this phase of the subject in a paper read before the Philadelphia County Medical Society (*Amer. Journ. of Obstet.*, 1893) entitled "Cesarean Section and its Substitutes," I have only to add that I believe the greatest good which will be accomplished by symphysiotomy will be that it will put a stop to the killing of unborn infants. Courageous and expert surgeons could save both mother and child by the Cesarean operation, but apparently they could not do away with the practice of embryotomy.

Symphysiotomy, also, has been performed in the same classes of pelvis in which, heretofore, the induction of premature labor has been practised. Hence these two operations come into competition. This is a phase of the subject which heretofore has attracted no attention. This fact renders it inexpedient to dogmatize at this time. But I believe that symphysiotomy is destined to supplant the induction of premature labor, especially as a hospital operation and in practice among the ignorant and the poor. Embryotomy heretofore has been employed to terminate arrested labors amongst the poor having deformed pelvis. Such people, as a rule, employ midwives or physicians who do not devote much study to their cases prior to the onset of labor. As a result premature labor is seldom induced among this class in private practice. Sym-

physiotomy will now supplant embryotomy among them.

In hospital practice the choice of operation will depend on the mortality of the mother and the child under the two operations. The advantages appear to be decidedly on the side of symphysiotomy. The maternal mortality from the induction of premature labor is variously stated by authorities. For example, according to Wyder's statement 5 per cent. of the mothers and 50 per cent. of the children die. Winckel states that of children born at from seven and a half to eight months only 33 per cent. are actually kept alive. Under the use of the incubator at the Leipzig maternity there was an infant-mortality of 18 per cent. in the hospital, and at the Paris Maternité there was a mortality of 30 per cent. It is also well known that the mortality of premature infants among the poor is very high in the first year of infancy, so that Winckel's estimate is probably correct.

In my judgment 5 per cent. is an excessive estimate of the maternal mortality of the induction of premature labor. One per cent., or certainly 2 per cent., should cover the mortality in careful hands.

The showing under symphysiotomy is much better. The maternal mortality is zero, and the fetal mortality is six in fifty-seven, or less than 11 per cent. The chances of the mature child delivered under symphysiotomy to reach maturity are likewise far greater than those of the immature child delivered about the thirty-fourth week of gestation. This is especially true of the children of the poor.

Among the intelligent and well-to-do, premature labor will probably be elected for a time; but if symphysiotomy continues as successful as it promises, it will supplant the induction of labor even in this class of cases. Intelligent people will not care to run the risk of losing their children from prematurity, or, what is worse, having them suffer from hydrocephalus (which is common in such children), and from various neuroses, if a mature child can be delivered with less risk to the mother under symphysiotomy.

The technique of the operation can be considered conveniently in connection with the report of a case of symphysiotomy which follows.

Mrs. X., the subject of this report, is a small woman, weighing one hundred pounds. She is thirty years of age, and has had five children, the last of which was delivered by symphysiotomy. A complete history of her five labors would be a fairly full consideration of dystocia due to deformity of the pelvis, together with the obstetric procedures used to complete such unnatural labors. The following are the measurements:

Height, 4 feet, 8 inches. A. S. S., 24 cm.; Cr. II., 26 cm.; Tr., 29 cm.; D. B. (ext. conj.), 16.5; C. D., 8.5; C. V. (estimated), 7 cm.

The first child, a boy, was born after a labor of 19 hours' duration. Delivery was accomplished by the forceps, the head being so injured by the vigorous compression and traction employed that the infant died shortly after birth. The child was not weighed. The second child, a girl, was delivered alive, spontaneously, after a hard labor of 14 hours. She was not weighed, but was so tiny that she was not expected to live. It is safe to say that she did not weigh *more* than five pounds. The third child, a girl, was delivered by Dr. Howard A. Kelly by Cesarean section. She weighed six pounds, fifteen ounces. The fourth child, a girl, I delivered, after the induction of labor at the thirty-sixth week, by a high application of the forceps. The baby weighed five and one-thirty-second pounds. The B. P. of the fetal head was 7.5 cm.; B. T. 6.5. The labor was extremely difficult, lasting 27½ hours. (Vide *Amer. Journ. of Obstet.*, 1890, p. 418).

I met Dr. Kelly in consultation, and concurred in the opinion that Mrs. X.'s third delivery could be accomplished only by craniotomy or the Cesarean operation. Dr. Harris also had expressed the same opinion. Mrs. X. and her husband unhesitatingly elected the Cesarean operation. Even had her medical advisers recommended craniotomy she would have rejected it. This was largely due to the fact that she is a Roman Catholic; but doubtless it was partly owing to the horrible death of a sister (who also had a deformed pelvis) under embryotomy—a combination, I believe, of version, craniotomy, and decapitation. The sister died from loss of blood. The issue of the case demonstrated the wisdom of the advice given, as delivery would clearly have been impossible without diminishing the head of a baby weighing 6½ pounds. This operation met with much unfavorable criticism, part of which was due to ignorance of the exact facts in the case, and to the prejudices arising from so-called conservatism, and part of which was due probably to animosity on the part of the critics. After this lapse of time those who were immediately concerned in the case can look back upon this operation with equanimity. Undoubtedly it had much to do with popularizing the Cesarean operation performed for the relative indication in this country.

Had there been a question as to the available room in this pelvis it would be settled by the fourth labor, in which a premature child, weighing 5½ pounds, was delivered with extreme difficulty. This head was delivered with the bi-temporal diameter engaged, and there was no room to spare. The fit was so tight that I feared it would be impossible to deliver the undiminished head. Yet this fetal diameter measured but 6.5 cm.¹

The fifth labor is the subject of this report. Mrs. X. consulted me when seven months pregnant. I found that already the head was so large that it could not be pressed into the pelvis. Two weeks later this disproportion was evidently greater, and a careful palpation of the child made at this time led me to believe that it was large rather than small.

¹ For a full consideration of the history of this case, vide *Amer. Journ. of Obstet.*, 1890, pp. 237 and 418.

Knowing the deformity of the pelvis, and having a lively recollection of the difficulties encountered at the preceding delivery, I became convinced that it would be wiser to do symphysiotomy at full time than to induce premature labor. I so advised the woman, but asked her to reserve her decision until she had consulted Dr. Parish, who agreed with me in advising symphysiotomy as against the induction of premature labor. So far as I know, this is the first time in which symphysiotomy has been elected over the induction of premature labor.

I opened the symphysis, and delivered by a high application of the forceps, December 5, 1892, at the Kensington Hospital for Women. The cervix being well dilated after a labor of eleven hours, the patient was put in the lithotomy position for operation. The bowels and bladder had been emptied, the lower abdominal, pubic, and pudendal regions cleaned, shaved and disinfected, and the vagina douched. The membranes were now ruptured. It was not considered worth while to try forceps-delivery before proceeding with the operation, because the head was free at the superior strait, and clearly too large to engage.

The operation was commenced by making an incision an inch in length in the median line of the abdomen and terminating at the symphysis pubis. This was carried down to and through the muscular and aponeurotic structures. More room was now afforded by detaching the muscle from the pubic bones by cutting transversely with scissors until the left index finger could be passed behind the pubes. The connective tissue back of the pubes is so loose that the finger encountered no resistance, and was easily passed below the pubic arch. The urethra being now depressed and dragged to one side by a catheter in the hands of an assistant, the Galbiati knife was passed along the finger as a guide, and hooked under the symphysis. This was divided by traction on the knife in an upward and forward direction. Much difficulty was encountered, as apparently the ligamentous structures were not abundant, and the knife became wedged between the bones. The symphysiotomy lasted twenty-six minutes. As there was considerable venous oozing, a sponge was packed behind the symphysis and gauze was laid over the wound.

The forceps was now applied, and the baby, a boy, was delivered after an extremely difficult forceps-labor, lasting thirty-seven minutes. This is explained by the fact that the baby weighed $8\frac{3}{4}$ pounds, and that the head measurements were B. P., 9.5 cm.; B. T., 9 cm.; S. O. B. 9.5 cm. After the symphysis was divided the bones separated one-fourth of an inch. After vigorous traction with the Hodge forceps they separated two inches, and the head became well engaged. The Tarnier forceps was now applied, when the head descended into the cavity of the pelvis, and a separation of $2\frac{1}{2}$ inches was obtained. Two assistants now supported the pelvis by pressing on the trochanter upon either side, and drawing upon the ilium of the opposite side. It was interesting to observe that the labor followed the mechanism of the flat pelvis. The head descended semi-flexed, with the occiput to the right

ilium and the sinciput to the left ilium, until it began to distend the pelvic floor, when flexion and internal rotation took place. The child was delivered asphyxiated, and required careful attention for ten minutes before it was resuscitated. The use of suspension, head downward, dipping in warm and sprinkling with cold water finally brought it around. The placenta was now delivered, and the vagina and the uterus were douched with sublimate solution, 1:2000. The sponge was removed from the operation-wound and the hemorrhage found to be controlled. Several silkworm-gut sutures were passed through the skin and muscle in each lip of the wound, which came nicely together. In the meantime the pelvic bones were pressed together by the assistants. A dressing of aristol and gauze was applied over the wound, over this rubber adhesive plaster, and finally a stout binder coming well below the trochanters. The legs also were tied together for some days. The patient was put to bed without shock.

In performing the operation I had the advantage of the counsel of Drs. Harris and Parish, and Drs. Boyd and Parish kindly took charge of the baby. The operation was witnessed by a number of physicians, among others the venerable Dr. J. G. Allen.

The after-history was absolutely uneventful—a normal puerperium. Tender and abraded nipples interfered with the baby's nursing, which prevented him from thriving for a time; but at the present writing he is fat and well. The extreme asphyxia present at birth probably influenced his nutrition for some weeks.

It was interesting to observe the entire absence of pain in the divided symphysis. I had expected considerable pain from the stretching of tissues, especially below the pubic arch; but the patient expressed herself as being perfectly comfortable.

The after-management of the case was somewhat troublesome, owing to the necessity of using a wide binder to preserve immobility of the pelvic bones. The vulva was washed twice daily with sublimate solution, and well dusted with boric acid. The vagina was douched on alternate days, more especially to assist in the rather troublesome task of keeping the parts clean. This was troublesome, because it was thought best to keep the legs together.

As a matter of convenience, I used two binders. The one next the skin was of two thicknesses of heavy muslin, made with "three tails." The outer one was of canvas. The bandages were secured with safety-pins, and finally when the muslin bandage was dispensed with, straps and buckles were attached to the canvas bandage.

In cleaning the patient the outer binder was unfastened, and also the lower tail of the muslin binder. The legs were then separated just enough to permit cleansing the vulva. About every third day it became necessary to apply a clean muslin binder. The patient was rolled on her side, the legs being in apposition, and the pelvis supported, when the soiled binder was removed, and the opportunity embraced to wash the region of the buttocks. A clean binder was then placed in position, the pelvis well supported, and the patient rolled on her back,

when the two binders were fastened. In this way it was possible to keep the patient clean, and at the same time keep the pelvis immobile.

Union of the joint was apparently complete in two weeks. The sutures were removed in six days. Wishing to run no risks of poor union, the patient was kept in bed four weeks, then sent home, and confined to bed for another week. Shortly afterward she was doing the housework for a family of six.

2134 HANCOCK STREET.

In the discussion following the reading of the paper Dr. R. P. HARRIS said: Dr. Noble's patient came under my observation May, 1888, when I saw her in consultation with Dr. H. A. Kelly at her own house, and recommended that she should go to the Kensington Hospital for Women, and there be delivered by the Cesarean operation, which was performed a few days later. When she was pregnant for the fifth time I had become convinced of the value of symphysiotomy, and thought it adapted to her case, because of the form and size of her pelvis, and recommended that it should be selected as a preparation for delivery.

Unfortunately for the facility of its extraction, the fetus proved to be a male, and much larger than any of her former children, so that it made a very narrow escape for its life, being deeply cyanosed and difficult of resuscitation. It, however, thrived well during its mother's recovery, which was free from any pelvic pain or uneasiness. No convalescence after parturition could have been more devoid of symptoms indicative of the enlargement to which her pelvis had been subjected; and when I examined her on the twenty-second day I found pubic union firm and solid.

Dr. Noble's case is one of the most interesting on record, because of its historic character, as symphysiotomy was brought into contrast with the improved Cesarean section and with delivery under induced labor in the same subject, and all with entire success to mother and child. I know of no parallel case in my obstetric readings, and of no evidence in contrast that is more to the credit of the recently introduced method of delivery.

Under an improved technique and proper antiseptic precautions, the operation of Sigault has been robbed of all traumatic dangers, and would appear to be devoid of any risk, when regarded from a surgical aspect. Deaths have taken place since the operation was perfected by Prof. Morisani, and no doubt will continue to take place, when women are operated upon *in extremis*; just as deaths follow after delivery by the forceps or in cases in which craniotomy has been performed. What we contend is that the prior condition of a parturient woman is not rendered the more likely to prove fatal by reason of the section and opening of her symphysis to aid delivery.

During the past seven years, four women out of seventy have died, in whose cases delivery was accomplished with the aid of symphysiotomy: one in Naples in 1890; one each in Helsingfors, Russia, and in Paris, in 1892, and one in the United States this year. The Neapolitan woman was in labor for several days when taken to hospital; the shoulder presented and the cord prolapsed; delivery was accomplished by version,

and death took place in twelve days from metro-peritonitis. The Helsingfors patient died of heart-disease and other organic complications on the second day. She was forty years old, and in her ninth pregnancy. The Paris case had been in labor three days with her fourth child; the forceps had been applied three times at her own home, and four times in hospital; one of the last, antero-posteriorly. She died the day after delivery, and a small perforating laceration was found leading from the uterine cavity into Douglas's cul-de-sac. The fourth death was in a woman almost moribund, having a pulse of 150. The children were lost, except in the cardiac case and the fourth that died. Certainly death could not be ascribed to symphysiotomy in any of these cases.

Since September 29, 1892, this operation has been performed ten times in the United States and once in Canada, saving ten women and eight children. One child died in twenty-four hours, from the effect of long-continued pressure upon its head in the lower pelvis, and one in three days, from meningeal hemorrhage: the third has not been reported.

The American operations have been performed, in chronological order, by Prof. Charles Jewett, of Brooklyn; Prof. Barton Cooke Hirst, of Philadelphia; Prof. Anna E. Broomall, of Philadelphia; Prof. Edwin J. Michael, of Baltimore; Dr. Charles P. Noble, of Philadelphia; Dr. J. A. Springle, of Montreal; Dr. Harry McKennan, of Paris, Illinois; Prof. Henry J. Garrigues, of New York; Dr. John Milton Duff, of Pittsburg; Prof. William T. Lusk, and Prof. Henry C. Coe, of New York. In Dr. McKennan's operation, not having a sufficiently strong bistoury, the symphysis was divided by means of a narrow metacarpal saw, guarded by the index finger.

We may arrange the history of symphysiotomy into three periods, viz.: 1777 to 1858; 1866 to 1886, and 1886 onward. In the first period there were over 100 operations; in the second there were 73; and in the third, as far as heard of, there have been 70, of which 36 were in the year 1892, divided as follows: In France, 13; in the United States, 7; Italy, 6; Germany, 5; Russia, 2; Canada, 1; Ireland, 1, and Austria, 1. As Italy had 12 in 1891, it is probable that there were as many as 40 in 1892, as against 12 in 1891.

Some men cannot comprehend my statistics, and are led to believe that *some* of the unfavorable cases must have been hidden away from those who aided me in their collection, in order that the improvement in results should appear so remarkable. We have only to state that a large proportion of the reports were copied from hospital records, and that many other statements came through correspondence. An examination into the diminished mortality of ovariectomy, the Cesarean section and abdominal hysterectomy will show what marvellous changes have been effected within a few years, in the reduction of the death-rate, under antiseptic management.

It was at one time thought that a Porro-Cesarean section, with the stump treated intra-peritoneally, was almost equivalent to a sentence of death, because only one woman was saved out of the first eleven, and yet 25 operations in order, covering the years 1888, 1889, 1890, 1891, proved fatal to only three women. This week brought me a letter from Prof. Leopold, of Dresden, stating that he had performed the Porro operation

eight times without the death of a mother, and that 42 improved Cesarean sections in the Frauenklinik had cost the lives of but four women.

The results of obstetric surgery in the hands of very skillful men are certainly trying to the faith of the casual observer, but they are none the less worthy of credit. Dr. Hubert Riedinger, of Brünn, Austria, was an early operator after the Porro method, having commenced in 1878; and his records show that he has performed 15 sections, saving all of the women and losing but one child.

The late Karl Braun (13), the late August Breisky (8), and Drs. Riedinger (15), and Leopold (8), had collectively 44 Porro operations, and lost but 3 women and 8 children. Such records show the possibility of the operation, but a general hospital report, as of the Maternities of Leipzig, Dresden, and Vienna, is of much more value in the estimation of risks.

If puerperal celio-hysterotomy and celio-hysterec-tomy have been so largely reduced in their rates of mortality, why should it be regarded as almost incredible that the operation of symphysiotomy, upon women in a *proper condition*, should have no mortality? If what was once regarded as "the murderous operation of *bi-pubiotomy*" has been recently revived in Paris, under Prof. Adolphe Pinard, with the saving of both mother and child, why should we fear the traumatic results of a simple symphysiotomy? In Pinard's case there was a true conjugate of 8.5 c.m., but one sacro-iliac symphysis was ankylosed, and the pelvis was oblique, hence the change of method. This operation originated with Prof. Galbiati, of Naples, who performed it on March 30, 1832, upon a dwarf three and a half feet high, having a one-inch conjugate; the child was dead, the woman died in four days of gangrene of the genitalia and vagina. Ten years later, Dr. Ippolito repeated the operation in Naples, with the same result. Prof. Pinard evidently thought that this operation originated with Dr. Farabeuf, of Paris, who proposed it to him, and he recommended that it be called by his name instead of *ischio-pubiotomy*, by which he reported it before the French Academy of Medicine, on January 10, 1893.

DR. BARTON COOKE HIRST said: Without doubt this operation has now become firmly fixed among justifiable obstetric procedures. There have already been ten operations in this country, and I shall probably add another to-morrow. I have only one remark to make to-night in regard to this matter. After my own operation, which I have already reported, I had a conversation with the President, and received from him a very original and brilliant suggestion. Dr. Mitchell asked me if there were not some way of permanently enlarging the pelvis in the operation of symphysiotomy. It seemed to him that by the insertion of ivory pegs, or by other means, the widening of the pelvis could be maintained. This is a brilliant idea, and I had hoped to have had before now the opportunity of trying it upon animals. The proposition is very interesting and deserves careful consideration. The enlargement of the pelvis in symphysiotomy is considerable. A recent German experimenter has examined, post-mortem, the pelves of three or four women within a few days after delivery, and has found that with a separation of the symphysis to seven centimeters, symphysiotomy gave an increase

of three centimeters in the oblique and transverse diameters, and of over one centimeter in the antero-posterior diameter. This enlarges the capacity of the pelvis materially. It would be a brilliant achievement if this could be made permanent by the operation, and if by medical skill we could transform the previous anatomic condition of the patient. It seems almost like sacrilege to think of it. It reminds one of adding a cubit to one's stature, but it seems possible, and I hope soon to have an opportunity of testing Dr. Mitchell's suggestion upon pregnant animals.

PROMINENT SYMPTOMS OF HYPERPHORIA, AS ILLUSTRATED BY THIRTEEN SUCCESSIVE CASES.¹

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In this analysis of symptoms only those cases positively traceable to hyperphoria are included, as demonstrated by their relief or cure, following the correction of the muscular anomaly. Other causes, such as errors of refraction, constitutional diseases, and uterine affections, were excluded.

CASES.

No.	Age.	Occupation.
1. Miss F.,	18 .	School-girl.
2. Mr. F., married,	49 .	Stock-broker.
3. Mrs. S., "	48 .	Housekeeper.
4. A. van S., single,	19 .	Farm-hand.
5. Mr. R., married,	31 .	Merchant.
6. Mrs. McP., "	35 .	Housekeeper.
7. Mr. K., "	36 .	Merchant.
8. Mr. M., "	36 .	Preacher.
9. Mr. B., "	55 .	Superintendent R. R.
10. Miss M.,	28 .	School-teacher.
11. Mr. P., married,	43 .	Lawyer.
12. Miss P.,	16 .	School-girl.
13. Capt. M., married,	42 .	Army officer.

In two cases the patients complained of their eyes only.

No. 7, a strong, healthy man, free from nervousness of every kind, had pain in the near use of his eyes, so that he was altogether debarred from reading. A correction of a low degree of hyperphoria, worn for several months, was of no service. He was relieved by a tenotomy.

No. 3, a small, delicate woman, complained of constant lachrymation. This had been treated unavailingly for two years by the usual methods. A correction of her hyperphoria and astigmatism had been worn for the same length of time. No tears or mucus were retained in the lachrymal sacs, and both nasal ducts were permeable to large sounds. No nasal obstruction could be determined. The condition was favorably modified by two tenotomies.

¹ Read before the American Ophthalmological Society, July 1892.

Photophobia in moderate degree was present in five cases, Nos. 2, 5, 8, 10, and 11. Exposure to the lights of a theater, combined with the effort of seeing the performance, was followed by pain in the eyes and head. No. 11 suffered intensely for from twelve to eighteen hours after each visit, and was obliged to relinquish that form of amusement. Partial or complete relief was obtained by one or more tenotomies. Pain in the eyeballs, either constant or induced by reading, was a prominent symptom in all of the cases. It presented, however, no points of difference from that due to errors of refraction.

REFLEX SYMPTOMS.—Six cases, Nos. 1, 2, 4, 5, 10, and 11, complained chiefly of headache.

Of these six cases, Nos. 1, 2, 4, and 10 may be classed together. Their headache was a constant dull pain, aggravated by any attempt to use the eyes, by travelling, by bright lights, and by similar circumstances. The pain in Nos. 5 and 11 was of a different character. It was sharp, lancinating, intense, commencing in the eyes and spreading to the head, and was at times attended by nausea and vomiting; it occurred twice or thrice weekly, increasing in severity as the day advanced, and was relieved by a night's rest, or quiet and opiates.

Case 11 demands a special word. His headaches began during his college life, twenty-five years ago, and have continued, varying in intensity and frequency according to his environment and the demands upon his eyes. A correction of myopia and astigmatism had no other effect than to improve his vision. Resumption of business, after a year's absence from home in search of health, was speedily followed by a return to his former condition. A tenotomy for hyperphoria, 2°, has given him entire relief. Six months have passed, and he has suffered but once, a few days after the operation. The history of No. 5 was similar, but extended over a shorter period. His headaches recurred three times weekly, necessitating on those days the abandonment of all work. At the time of my examination he was wearing a perfect correction for a low degree of mixed astigmatism. Prisms for the correction of hyperphoria, 3°, gave immediate relief, with no relapse in three months.

Six cases, Nos. 2, 6, 8, 9, 10, and 11, suffered with vertigo and dizziness, induced by reading, riding in a carriage or railroad train, or by watching rapidly-moving objects, by bright sunlight or artificial light, or by gazing for a protracted time on objects in close proximity.

Two cases, Nos. 6 and 8, were subjects of violent dyspepsia. Digestion was slow, painful, and incomplete, unless the patients sat quietly, and with closed lids.

In four cases, Nos. 2, 5, 6, and 8, the most conspicuous symptoms were excessive nervousness, irritability of temper, and at times mental confusion, associated with headache and inability to use the eyes without discomfort. Attention had not been directed to the eyes as a possible cause of the trouble until after months or years of unavailing treatment directed to other organs. No. 8 became unfitted, through "nervous prostration," to perform the duties of his profession as a preacher. Study was absolutely impossible; writing a few minutes by artificial light gave him a sleepless night; in conversation his ideas were obscured and thoughts confused by a painful consciousness of self; his temper became irritable; his equanimity was disturbed by trivial incidents of home-life that formerly were unnoticed; he became unsocial, despondent, and fearful of himself. Two tenotomies, separated by an interval of two months, have brought about marked improvement in the mental symptoms, enabled him to again find pleasure in his books, and to partly resume preaching. No. 6 had been under treatment for various affections, including uterine disease, for several years, but at the time she came under my observation was free from physical ailment, and had concluded, as a last resource, upon the advice of her family physician, to consult an ophthalmic surgeon. She was excessively nervous and restless, and could with difficulty remain quiet a few minutes. Indeed, while undergoing examination for refraction, violent twitching of the muscles of the face, arms, and hands developed. Her nervous history included chorea, irritability of temper, temporary loss of memory, or a forgetfulness of the commonest things in every-day life. She was disturbed by trifles, her self-control was lost at times, and only regained by seeking seclusion in a dark room, when her thoughts immediately became logical. I found hyperphoria in emmetropia. A rational explanation of her symptoms should be sought in the exaggeration of the susceptibility of an exceedingly nervous organization, induced by long-continued suffering from uterine and other complications, and maintained, after these causes were removed, by eye-strain. I am warranted in this assumption by the change effected by correcting prisms. After wearing them a few minutes her restlessness subsided. After a few days she reported decided improvement. Withdrawal of the prisms was followed by a renewal of the symptoms. A tenotomy was performed, but I cannot at this time state the final result.

My experience with prisms and tenotomies for the cure of local and reflex symptoms referable to the eyes, but not to an error of refraction, encourages me to seek for their cause in muscular anomalies.

ORIGINAL LECTURE.

DESTRUCTION OF THE GASSERIAN GANGLION
FOR TRIGEMINAL NEURALGIA; WITH A
REPORT OF TWO CASES.

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[Reported by A. L. BENEDICT, A.M., M.D.]

CASE I.—This patient, a man aged 53, thin, worn-out, and haggard, shows in every lineament the evidence of intense and prolonged suffering. His history is one of chronic, intractable, spasmodic facial neuralgia of the right side, extending over a period of five years. As is usual in such cases, we cannot elicit any facts from the antecedent history which will account for the neuralgia. In certain cases we may ascribe neuralgia to diseased teeth, to tumors pressing on some part of the fifth nerve, or to manifest reflex causes, but, as a rule, we must look more deeply for an explanation. In this instance, the pain was at first referred to the branches of the second (superior maxillary) division of the fifth nerve; later it involved the first (ophthalmic) division; only rarely has there been pain shooting down the third (inferior maxillary) division. Whether this be a case of true neuralgia or one of neuritis, whether there be some little bony outgrowth, causing pressure on one of the branches of the nerve as it passes from the cranium, and affecting reflexly the other branches, or whether there be no tangible cause for the trouble, the demand for relief is equally urgent. The patient has been sent to me for that relief because life is not worth living to one in his condition and because he has demonstrated his opinion to that effect by more than one attempt at suicide. Although he has been taking morphine in grain-doses, his sufferings have continued and have made him irrational, so that his family have to watch him constantly to keep him from self-destruction. Under these circumstances it is proper to proceed to almost any extreme in order to afford relief, and even if death should occur as the result of surgical interference, the surgeon would not be blamable.

Before describing the operation, let me outline the anatomy of the trifacial nerve. Proceeding from the medulla, it passes beneath the base of the brain to the petrous portion of the temporal bone, over which it passes, crossing the lateral sinus, and enlarging to form the Gasserian ganglion, which is lodged in a depression on the upper surface of this petrous portion. Up to the Gasserian ganglion the nerve is soft and friable and unlike ordinary nerve-tissue as we meet with it surgically; in fact, it more closely resembles the white matter of the brain. After leaving the Gasserian ganglion it becomes firmer and more fibrous, and branches into three strong cords. The first division passes out through the anterior lacerated foramen, to supply the structures of the orbit with common sensation; its largest branch going to the forehead through the supra-orbital foramen or notch, and also supplying the scalp. The second branch makes its exit through the foramen rotundum in the great wing of the sphenoid, whence it passes into the sphenomaxillary fossa. Here it connects with Meckel's ganglion and thence it sends branches in various directions. Its main

trunk penetrates the upper jaw and a portion emerges from the infra-orbital foramen. The third division of the trigeminal nerve receives a motor root after leaving the Gasserian ganglion. It passes out through the foramen ovale a little below and behind the foramen rotundum and divides into the inferior dental and gustatory nerves after giving off muscular branches to the pterygoids, the masseter, and the temporal muscles. Although these branches may be accidentally divided, I shall give little attention to them to-day, for the diffusion of the pain points to its source in the Gasserian ganglion and an operation on one of the branches of the nerve would not be radical.

Several routes have been demonstrated by which the Gasserian ganglion can be reached. The first to destroy the ganglion was Professor Rose, of London, who did so at the instigation of a patient willing to risk anything for the sake of relief from the pain which he suffered. He removed the upper jaw—the locality in which most of the pain was felt, trephined through the base of the skull and attacked the ganglion. Professor Horsley has trephined through the skull laterally, and reached the ganglion from above, but the patient did not survive the shock of the operation.

The originator of the operation which I purpose performing to-day is my friend and former teacher, Dr. Andrews, of Chicago. He has reported two operations of his own of this kind; since then I have performed the operation once, and a surgeon of New York City has performed it once. Altogether the ganglion has been attacked about eight times before this.

I shall expose the zygoma by an H-shaped incision, saw it in two places, and turn down the detached portion with the masseter muscle. In order to secure the zygoma in place again, it will be necessary to drill each side of each line of section, and the drill-holes can be made more conveniently while the bone is firm than after dividing it. The turning down of the zygoma exposes the coronoid process of the inferior maxilla with the insertion of the temporal muscle. This process is also to be drilled twice and sawed across. Then, with the mouth widely opened, there is a space, not liberal but yet sufficient to allow one to attack the base of the skull under the Gasserian ganglion. There is a quantity of fat and connective tissue to be cleaned away from this fossa and the internal maxillary artery will probably require ligation. Then we get to the pterygoid plate, from which the external pterygoid muscle takes its origin. This muscle must be cleared away, perhaps by detaching it from the bone, perhaps by dividing it. Although it is a useful muscle, it is not essential and we may, if necessary, remove it entirely. Following the external pterygoid plate as a guide, we reach the foramen ovale, through which emerges the third division of the fifth nerve. The Gasserian ganglion lies between two layers of the dura mater, which splits to enfold it. The lower layer is very thin; the upper layer is strong and protects the superjacent structures. It is not possible to excise the ganglion as one might take out a tumor, for it is concealed from view and is soft and friable. I expect to tear it with a blunt hook and knife and thus to dispose of it as far as its function is concerned. If you recall the proximity of the middle meningeal and internal carotid arteries to the lateral sinus, you can appreciate

the difficulty of the operation. At my operation last summer, two hours and a quarter were consumed, but the greater part of the time was spent in checking hemorrhage from numerous small vessels in the sphenomaxillary fossa. I have decided to obviate this difficulty by tying the common carotid artery at the point of election, the guide being the anterior border of the sterno-cleido-mastoid muscle. There is usually found a little vein connecting the facial with the internal jugular, or sometimes the external jugular lies across the line of incision. This, however, is a matter of trifling moment. After dividing the platysma myoides and removing some connective tissue, I get down upon the carotid sheath. The descendens noni nerve lies upon this, and I turn it aside before dividing the sheath. It would cause no very serious trouble if one should fail to recognize the descendens noni and divide it. By means of a moderate-sized catgut thread I draw a heavy catgut ligature around the artery from the inner side. After tying the artery, I close the outer wound with a continuous buried suture, which has the advantage over the interrupted suture of being more quickly made and of leaving no cross-marks on the scar. An antiseptic gauze dressing is applied, and by the expenditure of a few minutes' time I hope to avoid the hour's delay which I experienced at the former operation. No one else, so far as I know, has seen fit to ligate the carotid before the main operation.

Now, as I make the H-shaped incision over the zygoma, you see what anastomosis will do, for in spite of tying the common carotid, there is considerable hemorrhage. I next scrape back the periosteum to expose a track for the saw, make the four drill-holes and saw and chisel through the bone.

The patient is pretty feeble, and if his strength shows signs of failing, I shall abandon the proposed operation and content myself with extirpating Meckel's ganglion, thereby hoping to do away with most of the pain, which is referred mainly to the second division of the nerve.

The balance of the operation was completed without special incident. The base of the skull was easily exposed, and the benefit of tying the carotid became very apparent, as very little delay was caused by hemorrhage, either active or passive. The trephine driven by the De Vilbis engine was used for a part of the work of exposing the ganglion, and small chisels for the rest. The dura was then opened, the ganglion broken up with a blunt hook, the second branch pulled out from the foramen rotundum, and, together with Meckel's ganglion, excised. The wound was then closed without drainage. A small incision was next made over the supra-orbital notch and the nerve found and pulled out from its channel till it broke; the external portion was removed.

The patient rallied well from shock and the wound healed rapidly, there being only a little superficial late suppuration. Pain was relieved at once, and the patient returned to his home, in Fairport, N. Y., in about twelve days.

CASE II.—The patient was an anemic woman of fifty-four. The right lateral region of the head had been previously shaved, and the head was enveloped in an antiseptic dressing. Chloroform was administered. After the patient was placed on the operating-table the fore-

head, eyebrow and side of the face were shaved in order to remove fine hairs and sebaceous matter. The brow was shaved in anticipation of the possible necessity of operating on the supra-orbital branch of the ophthalmic nerve.

The first incision, 5 cm. long, was made at 11.35 A.M., directly downward from the external angle of the orbit. The second incision was parallel to the first, $\frac{1}{2}$ cm. in front of the tragus. These incisions were connected by a horizontal incision over the zygoma. The periosteal elevator was used to mark the lines of division of the zygoma. The telescope drill was applied to either side of each line, the zygoma separated by saw and forceps at the outer line, by saw and chisel at the inner line. One of the inner perforations was crossed by the line of section of the bone, and another perforation was made. Spiculae of bone were removed by the cutting-forceps. Fat was removed from the zygomatic fossa and three small bleeding vessels were tied. The elevator was slipped under the coronoid process of the inferior maxilla, and the bone drilled twice for subsequent wiring.

At 11.49 the coronoid process was severed by cutting-forceps and reflected upward. There ensued much venous oozing, that prevented the finding of the internal maxillary artery. The wound was stuffed with gauze for two or three minutes. An assistant then held the mouth open, the absence of teeth rendering the gag superfluous. A 5 per cent. antipyrin-spray was used to check hemorrhage. At 12.04 the internal maxillary artery was found to have been accidentally divided; one end was pulsating but closed by a clot, the other end was bleeding. Both extremities were tied with fine catgut. The artery was very small.

Dr. Park stated that he could now feel the foramen ovale, but could not feel the nerve. Small sponges in hemostats were used to clear the bone of fat, cellular tissue and blood. At 12.15, the antipyrin-spray was again used. A trephine about $\frac{1}{2}$ cm. in diameter was applied to the sphenoid bone, the motive power being a surgical engine turned by hand. After penetrating the bone and removing the fragments, there was some hemorrhage from the small meningeal artery, which is easily torn in such operations. The trephine-opening was connected with the foramen ovale by means of a small chisel. Delay followed on account of hemorrhage. At 12.45, the dura matter, pulsating, bulging under the Gasserian ganglion, was exposed in an oval area about 1 cm. by $\frac{1}{2}$ cm. At 12.56, the outer layer of the dura, apparently double, was divided and the ganglion exposed. On attempting to cut it there was considerable hemorrhage. A blunt wire applicator bent into a hook was used to tear the ganglion. The cavity was stuffed with gauze to control hemorrhage. The bony margins were chipped away with a chisel. Transmitted impulse was very marked. The antipyrin-spray was again used. At 1.10 the fragments of the ganglion were torn away with a small hook, the second branch of the nerve was pulled out of its channel and a portion, including Meckel's ganglion, was cut away. The supra-orbital nerve was pulled through the notch and excised. The coronoid process was restored to its place with silver wire passed through the drill-holes. The zygoma was similarly secured. The wound was closed with catgut over catgut drainage and an antiseptic dressing was applied.

CLINICAL MEMORANDA.

SEVERE FRACTURE OF THE VERTEX, WITH
REPLACEMENT OF A LARGE FRAGMENT OF BONE.

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AND
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OUR excuse for presenting this case is principally the unusual size of the fragment removed and the promptness with which it reunited with the periosteum. So far as our research has extended, it appears to be the largest piece of bone on record completely torn from its attachments and successfully replaced. The extent and distribution of the pareses are also of some interest.

At about noon of June 17, 1891, we were summoned to an "accident case" at a coal-mine about three miles east of Des Moines. On our arrival at the place we found the "pit-boss," a Scandinavian of about thirty-five years of age and a magnificent specimen of physical development, lying upon a rickety cot in the shanty at the mouth of the pit, with the top of his head literally crushed in.

We were told that about an hour before he had gone down into the mine on a tour of inspection, and sending the cage-tender to make some repairs, had taken charge of the shaft-base himself. While reaching forward into the cage to get hold of an empty truck, he was struck on the head and rendered senseless by a large piece of falling coal, which had in some way been dislodged from a loaded car at the top of the shaft, 120 feet above. One of the men heard the whiz of the falling coal, followed by a heavy thud, and running to the spot found the boss stretched across the empty truck, with a frightful gash across the top of his head.

The wounded man was lying quietly on his cot, in a curiously apathetic condition, his eyes wide open and glancing with apparent recognition at everybody about him, without a sign or trace of pain, or even uneasiness in his position or expression, and completely aphasic. He seemed to hear perfectly, turning eyes and face promptly toward the speaker; his pupils were normal in size and activity; breathing was easy and regular; the pulse was 70, full and elastic; face and extremities were pale and cool. The man could move his right hand and arm fairly, but slowly, and opened his mouth and protruded his tongue with perfect steadiness when directed to do so, but otherwise seemed completely helpless. When his wound was touched the muscles of his face moved a little, but with no sign of pain. In short, there was loss of speech and of sensibility and motility in the greater part of his body, though in other respects the condition of the man appeared normal. He swallowed readily the liquids given him, and the sphincters were unaffected.

On examination, a gash was found extending from about the right parietal eminence to about an inch above the left mastoid process, at the bottom of which could be felt and seen a long, jagged, depressed fracture. Any operation in that tumble-down shanty, with no furniture

save a broken cot and rusty stove, being out of the question, a temporary dressing was hastily applied and the man was lifted into an ambulance, which had followed us from the city, and conveyed to his home, some three miles distant. Just as the dressing was being laid in place, the patient lifted his right hand to his head, and withdrawing it covered with blood, held it before his face and gazed at it curiously for several seconds, seeming to recognize the condition of affairs, but without giving the slightest sign of fear or uneasiness. He stood the trip splendidly, without any appearance of discomfort except a slight contraction of the facial muscles as he was being lifted into the ambulance. Everything was in readiness by the time he arrived—a large dining-table covered with blankets and an oil-cloth, several gallons of boiled water, and the instruments arranged in boiled water.

On careful examination a large segment of the calvarium, about $4\frac{1}{2}$ by $2\frac{1}{2}$ inches, of a triangular shape, was found depressed completely below the surface of the inner table: its longest (posterior) border ran diagonally across the vertex, from $5\frac{1}{2}$ inches directly above the right to 4 inches above and $\frac{1}{2}$ inch behind the left auditory meatus, while its obtuse angle lay directed forward at a point $4\frac{1}{2}$ inches above the middle of the left superciliary ridge. The surface of the depressed portion and of the skull for from $\frac{1}{2}$ to 1 inch all around was completely stripped of periosteum, which, with the other tissue of the scalp, was turned forward in a huge matted flap, swollen by extravasated blood to a thickness of fully $\frac{3}{4}$ of an inch, and with its edges and under surface literally asphalted with coal-dust.

A little extension of the gash at its edges with a scalpel allowed this to be turned forward completely out of the field of operation, and the cavity having been thoroughly cleansed and flushed with very hot (110° – 120°) boiled water, the head was shaved and a couple of buttons removed with a half-inch trephine, one in front about an inch from the right extremity of the fracture, and the other behind and about half an inch from the left extremity. The patient winced a little at the grating of the trephine and groaned slightly, but otherwise gave no sign of pain during the operation, so that no anesthetic was required.

An elevator was introduced, first through one hole and then through the other, but the fragment was positively overlapped by the edges of the skull, like a keystone by the sides of an arch, and it was only by each taking an elevator and literally prying the edges backward and the fragment upward, that it could be made to budge. When it did become loose, it was with such suddenness that the piece went flying not only clear of the wound, but almost clear of the table.

Only a few shattered fragments of bone were left, at about the middle of the posterior border of the gap. The large fragment was promptly placed in a bowl of blood and hot water, and the operation proceeded with. After the shattered pieces were removed, and the surface of the inner table all around had been explored for splinters with the finger, the dura was found unbroken except at a point near the left acute angle of the gap, where a small spicule had been driven through it to the depth of about half an inch.

There was a good deal of bulging of the membranes,

and subdural hemorrhage was feared; in fact, there was quite a free flow of blood through the puncture made by the spicule; but it appeared to be principally venous, and we succeeded in checking it entirely and moderating the bulging by prolonged affusion with hot (boiled) water poured out of a pitcher into the wound. This done, the fragment was taken out of the bowl of "culture-fluid," and after much manipulation and the application of considerable lateral traction was reinserted into the gap, the sides of which held it as if in a vise. It fitted as accurately as a segment of a Chinese puzzle, with the exception of the small space on the posterior border occupied by the shattered fragments. Neither these nor the trephine-buttons were replaced, with a view to leaving a little room for relief of any tension that might occur.

The wound was then freely flushed with a fifteen-volume solution of hydrogen dioxide, and the edges of the flap were thoroughly cleansed with the same solution and stitched together as accurately as possible, although perfect coaptation seemed almost out of the question on account of the swollen condition of the tissues of the scalp. No opening was left for drainage, and a simple pad of moist carbolized gauze dusted with iodoform was applied.

Almost immediately upon the elevation of the fragment the patient lifted his head, inquired where he was, and answered questions slowly but rationally; he also winced when the hot water was poured into the wound, and when the sutures were introduced; but, when asked if he felt any pain, replied: "None to speak of."

The operation occupied about an hour and a half, and at its close the patient was in a condition of shock, though not at all profoundly so. A subcutaneous injection of strychnine, with morphine and atropine, was given; hot bricks and bottles were packed around him in bed; and he soon rallied. Four hours later he was perfectly conscious and resting quietly, with a weak but otherwise natural pulse. On the next morning his temperature was 99°, his pulse 72.

When the dressing was removed the swelling of the scalp was found greatly diminished, the edges of the wound glued together, and not a drop of pus anywhere. There had been a free leakage of reddish serum into the dressing. The parts were flooded with hydrogen dioxide, and the dressing was reapplied. On the next morning the temperature was 99°, the pulse 75; the swelling of the scalp was two-thirds gone and the wound united by first intention along its whole course, with the exception of the lowest angle, where there was a slight opening, through which we pressed out nearly half an ounce of reddish fluid, resembling broken-down blood-clot.

On the following day (June 20th) the temperature stood at 98.5°, where it remained all through the remainder of the case, and a smaller amount of reddish fluid was passed out through the opening at the lower angle. Some ecchymosis developed at the left temple, but gave no trouble, and gradually faded away in a few days. The patient then took fluid food freely, stating that he felt "only a little soreness of the scalp"; he rested quietly during the day, but at night was restless and inclined to be delirious, twisting about in the bed, clutching at the bandages, and attempting to scratch the top of his head. From this time forward the surgical course of the case

was an uneventful progress toward recovery. There was absolutely no formation of pus, the only discharge being a slight amount of clear, yellowish fluid of about the consistency and appearance of honey.

About two weeks after the accident the probe detected a patch of bare bone, about half an inch in diameter, at the point of greatest splintering, and a number of tiny osseous spiculæ were discharged at intervals, up to as late as eight months afterward; but with this exception the whole fragment seems to have united with both periosteum and diploë perfectly.

The mental condition of the man was normal throughout, with the exception of the nocturnal delirium spoken of, which on one or two occasions rendered him quite difficult to control, and a decided irritability of temper and suspiciousness of mind on the third and fourth days, especially toward his wife, whom he several times ordered out of the room, saying that she was trying to keep him from getting well. These manifestations, however, soon passed away.

The most interesting features in the case were the pareses, which were strikingly characteristic. Upon recovery from the shock of operation, both legs were found to be completely paralyzed, with the exception of the right hip and thigh, which were only partly so, and could be slowly flexed on the body with a little assistance from the right hand. The left arm was powerless, with the exception of a little feeble movement in the forearm and hand; while the right arm was under good control, with the exception of the deltoid, in consequence of which he was unable to lift it above the level of the shoulder. The muscles of neck, face, jaws, and trunk were apparently unaffected. Speech was somewhat hesitating, but otherwise perfect.

Sensibility was everywhere preserved, although apparently slightly dulled, as the man felt little or no pain when the wound was dressed or touched. The sphincters were unaffected. The pareses remained stationary, or, if changed, were slightly increased for three days, after which gradual improvement set in, which steadily continued to recovery, except in the right leg.

In ten days the man began to move the left leg a little; in a month he could stand alone for a few minutes; in six weeks he was able to scramble into his buggy and drive to the office or to walk about slowly with a couple of sticks.

At present, a year after the accident, the man has perfect control of all of his muscles, excepting those of the right leg and thigh, which still feel "heavy and stiff." The disability is decidedly most marked in the calf and foot, which latter, when lifted, tends to assume the fetal position, with the sole drawn upward and inward. The muscles are firm, well-nourished, and strong; the limb will support his whole weight easily, and if he moves slowly and quietly he can, with the aid of a cane, walk considerable distances with ease; but if he gets excited or attempts to hurry, the leg "goes stiff" at once, and he can hardly move it. There are and have been no sensory disturbances except a well-marked and at times severe tingling and "cramping" while the pareses were first disappearing.

Upon careful measurement, the posterior scar was found to extend diagonally across the vertex from a point three inches above the posterior border of the left

mastoid process to a point just in front of the right parietal eminence: The posterior line of fracture lay half an inch anteriorly to and was one inch shorter at either extremity than this. From the extremities of this, two slightly elevated and roughened lines of united fracture could be distinctly traced, running forward and inward and meeting four and one-half inches directly above the middle of the left superciliary ridge (at the coronal suture, three-quarters of an inch below the bregma), thus making the replaced fragment four and one-half inches in length by two and one-quarter inches in its greatest (antero-posterior) breadth.

The posterior line of fracture—the line of actual impact and of greatest depression—crossed the sagittal suture about one-eighth of an inch behind the upper extremity of the fissure of Rolando according to Thane (seven inches out of thirteen and one-quarter inches), or about one-quarter inch behind, according to Broca (two and one-eighth inches behind bregma), while the area of splintering, in which the spicule penetrated the dura and from which dead bone was subsequently discharged, lay three-quarters of an inch to the left of and half an inch anteriorly to this, thus covering accurately the very center of Horsley's "leg-area." The other pareses have an equally clear origin. While the fragment was depressed, its extremities, of course, reached lower down upon the surface of the brain, low enough upon the left side to press upon the speech-center and produce aphasia, which was promptly relieved by the elevation of the bone, while it completely covered the leg-area and arm-area on both sides, with the exception of that portion of the left arm-area lying anteriorly to the Rolandic fissure (for the right forearm and hand).

The centers that lie highest were most severely affected in regular gradation: the legs were more completely paralyzed than the arms, and were much slower in recovering. The same is true as between the different parts of each limb; in the arms, the fingers and hands were the least affected and quickest to recover; the shoulders most affected and slowest; indeed, I think there is still a little lack of power in the right shoulder, although the patient declares it to be as strong as ever.

In the legs, the hips and thighs were the least affected and first to recover; the ankles and feet, most affected and last to recover; the only marked remaining paresis being that of the right foot and calf.

In view of the shattering of the bone and wounding of the dura in this region, it seems probable that a certain amount of cortical tissue was damaged beyond possibility of repair, and that such control as the patient possesses over the limb is through the functional activity of the corresponding center of the opposite side—a fact that would also account for its "growing stiff" during hurry or excitement, the center being, so to speak, not yet educated up to taking care of both limbs at once under pressure.

Paraldehyde for Spasmodic Asthma.—MACKIE (*British Medical Journal*, No. 1672, p. 65) has reported the employment of half-dram doses of paraldehyde, repeated every half-hour or hour, in the treatment of a number of cases of spasmodic asthma, with uniformly successful results. Spasm was speedily relieved and sleep soon followed. In no case were more than three doses required, and usually one sufficed.

ACHILLODYNYA.¹

BY AUGUSTUS A. ESHNER, M.D.,

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THE man whose case I herewith detail presented himself at Jefferson Medical College Hospital, in the service of Dr. H. A. Hare (by whose courtesy this report is made), complaining of swelling and soreness in the region of the heels, that had been present for about four weeks. He was twenty-two years old, a car-cleaner by occupation, and stated that he had had a similar attack three and a half years previously that lasted for about fourteen months, and apparently had disappeared spontaneously. The pain appeared after walking, and was relieved by rest, either in the sitting or recumbent posture. The swelling, however, persisted. There had been no traumatism of the parts, and there was no history of rheumatism, and none of gout. The man had been infected with gonorrhea four years previously (that is, half a year preceding the first attack of swelling and pain about the heels). The urethritis had never been entirely cured, remaining at times latent for months, and then breaking out with its former intensity. Within this time, he stated, one of the testicles (perhaps it was the epididymis) had been swollen, and there had been enlargement of one or more glands in the right groin. No history could be obtained of a sore upon the genitals, of cutaneous eruption, of involvement of the mucous membranes, of alopecia or of other manifestation suggestive of secondary syphilis. There was no heart-lesion, and the urine presented no abnormality. There was no history of a similar affection in other members of the family.

On examination a firm swelling was found above the heels, apparently inseparable from the os calcis, and over which passed the tendo Achillis. Manipulation induced pain. Station was steady; the knee-jerks were preserved; the pupils were equal, regular, and responsive to light. I was at a loss to account for the condition, as I had never before seen its counterpart; and in the absence of more definite information I made a tentative diagnosis of syphilis. It was directed that small blisters be applied to the heels on either side of the tendo Achillis, and potassium iodide was prescribed for use internally. The man returned a short time afterward, unimproved.

A few days after the case had presented itself I came by chance across a note in the *Wiener medicinische Presse*, 1892, No. 2, p. 43, by Professor Albert, of the University of Vienna, in which he reports one of a half-dozen cases that he has encountered in the course of a number of years, characterized by intolerable pain on walking or standing, while no discomfort was suffered in the sitting or recumbent posture. The pain was accurately referred to the insertion of the tendo Achillis, in which situation there was sometimes also a slight prominence, as if the tendon were thickened. As a rule the parts were not unduly sensitive upon pressure. In some cases the bone on either side of the tendinous insertion appeared to be enlarged. The pain was exceedingly rebellious and resisted hot applications, cold applications, counter-irritation with tincture of iodine and

¹ Read before the Philadelphia County Medical Society, February 8, 1893.

inunctions of mercury. Albert was unable to find any reference to the subject in literature. He relates that Raynal and Kirrison have described a "peri-tendinous cellulitis of the tendo Achillis," which, however, does not agree with the condition under consideration; and he refers to a description by Pitha (Pitha-Billroth's *Handbook of General and Special Surgery*) of a "partial rupture of the tendo Achillis" and a "partial evulsion of the insertion of the tendo Achillis," in which the symptoms recorded agree with those here detailed. The opinion is expressed that the cases attended with swelling of the tendon are described as instances of rupture, while the cases in which enlargement of the bone is present are considered as instances of evulsion. In one case of Albert's the pain was aggravated by exacerbations of a specific urethritis. Kirrison is also quoted as having noted in one case a connection with an attack of gonorrhea. Albert suggests that the condition may be analogous to a deformity sometimes found in horseback riders, dependent upon a hyperplasia of periosteum and bone at the point of attachment of the great adductor muscle of the thigh.

The name *achillodynia* is proposed for the affection, and is sufficiently descriptive, without committing one to any view as to its nature, etiology, and pathology. Concerning these we can only speculate. To complete the analogy with the condition found in riders, there should be, as suggested by my friend Dr. J. K. Young, a history of some corresponding muscular strain, such as standing on the toes for a considerable length of time. This was not present in the case here reported. The affection should thus be frequently encountered in professional dancers. The condition does not seem to be an acute inflammation. If the process be at all inflammatory the action is of an exceedingly low grade. The condition may be a neurosis, with trophic changes. There is one other possibility, and that is that, in some cases at least, the condition is a manifestation of an intoxication of gonorrheal origin.

I do not know what importance is to be attached to the condition here considered. Possibly it is less uncommon than would appear. I present the case as a clinical curiosity. It may prove interesting, perhaps instructive to others who may have encountered cases of a similar kind.

The features that seem to me to be of especial interest are the circumscribed character and the symmetry of involvement; the thickening above the heels; the absence of inflammatory symptoms; the presence of the pain only after walking; and the apparent spontaneous subsidence of the first attack.

A RARE OCCUPATION-NEUROSIS.

BY HAROLD N. MOYER, M.D.,
OF CHICAGO.

WRITER'S cramp was the first of the group of occupation-neuroses to be studied. For a short time it stood alone, but soon a number of other allied disorders, peculiar to those who pursue special occupations, were described, and they have all finally been grouped under the general term. It is probable that the occupation muscular atrophies ought to be included in the same general category. While the pathologic changes in these disorders are very diverse, they all have a common etiology

in the continued use of special muscles or groups of muscles.

Those occupations that require a continuous and delicate adjustment of the muscles of the hand seem to be most liable to this affection, the disorder being most frequently observed in writers, violinists, pianists, and telegraphers; but examples are not wanting in those occupations requiring extended excursions of the limbs and the use of the larger muscles, such as ballet-dancing, blacksmithing, and the like.

The occupation-neuroses may be naturally classified, according to the predominant symptoms, into spastic, neuralgic, tremulous, and paralytic forms; though it should be remembered that all of these occupation-neuroses bespeak essentially a disturbance in motility. It is probable that in most of them we have an essential neurosis, without structural change, though some form of peripheral neuritis often complicates the disorder.

The following case is unique in some respects, and, following precedent in these cases, might not inaptly be termed the shoe-salesman's disease.

S. C., twenty-six years of age, single, is a salesman in a large retail shoe-store. The family history is good. Though the patient is decidedly nervous, he has never had any serious sickness or injury. Four months ago he noticed a stiffness in both feet, but more marked in the right. He was then in the habit of sitting upon the right heel when engaged in fitting shoes; when in this position the foot was sharply flexed upon the leg, and the leg on the thigh. As he used the right leg the more in this way he changed to the left, when he observed that it in turn was more affected. He then began to use the right leg again, and the latter now gives him the more trouble.

There is very considerable loss of power in the anterior tibial muscles, especially on the right side. The foot on this side cannot be flexed beyond a right angle. On the left side he can do somewhat better, but there is a decided loss of power.

The right great toe is cold and numb. Extending from its tip to about the middle of the dorsum of the foot is a space, about one inch in width, in which the tactile sense and the temperature-sense are greatly impaired. There is, however, no loss of pain-sense in this area. Sensation in the left foot and leg is not impaired. The deep reflexes are symmetrically increased. There is no incoördination or evidence of disturbance in the central nervous system, with the exception of mild neurasthenia. The faradic current gives a contraction over the tibialis anticus with a coil distance of 5 cm. The contraction was alike on both sides. The galvanic gave K. C. C. 7 m.a. on the right side, and A. C. C. 4.5 m.a. On the left side minimum contractions were obtained by K. C. C. 7 m.a., and A. C. C. 7 m.a. The peroneal nerve gave a normal series of reactions.

It will be seen from a consideration of the foregoing symptoms that we have an occupation-neurosis, but one that is apparently dependent upon changes in the muscles or nerve-endings. The electric reactions show only a partial degeneration. The anodal contraction exceeds the kathodal in the right, or most affected, leg, but in the other the kathodal and anodal are equal. The faradic reaction is substantially alike on both sides. It is possible that we might have a pressure-paralysis, but it is difficult to see how pressure could be applied to the nerve

which supplies the anterior tibial muscle in the position in which the man habitually worked. The fact that the disorder affected the opposite side as soon as it was brought into use is against this view. The electric examinations thus far made in the occupation-neuroses are very contradictory, and it is impossible to say whether neuritis can be excluded by this means or not. It is just possible that the case may have some relation to the "paradoxical contraction" of Westphal. Certainly we have in this case a "paradoxical paralysis" in the fact that it occurred in a muscle that was placed in extreme relaxation by the movements which produced and intensified the paralysis.

MEDICAL PROGRESS.

Gastrotomy for the Removal of a Peach-stone from the Esophagus.—FINNEY (*Bulletin of the Johns Hopkins Hospital*, iii, 26, p. 117) has reported the case of a farmer, forty-nine years old, who, while eating a peach, stumbled and fell, and, in the sudden effort to recover himself, swallowed the stone, together with a portion of the peach. There was at once a sense of lodgment of the body about half-way down the esophagus. Immediately after the accident, prolonged and forcible, but unsuccessful attempts at removal had been made. For four days the man was unable to swallow more than half a teaspoonful of water at a time. There was a constant feeling, at times painful, of the presence of a foreign body in the gullet, with a continual inclination to swallow. A small, ivory-tipped probang encountered an impassable obstruction 12.3 inches from the incisor teeth. A sensation of tapping a solid body was perceived. It was impossible to dislodge the obstruction by means of bougies. On the following day the patient was anesthetized, and the probang was found to pass the obstruction, without, however, dislodging it. No better success was had with a horsehair probang and a flexible bougie. Preparation had been made to perform gastrotomy, if the circumstances warranted. An incision, 5½ inches long, was made, parallel with and three-quarters of an inch below the left costal arch. The stomach was exposed, lifted out, and incised for a distance of two inches. Neither with the hand nor with various instruments tried was it possible to dislodge the foreign body. Finally, a bougie was passed into the esophagus through the stomach, and brought out at the mouth. To the extremity of the bougie was attached a strong silk thread, to this a sponge, and to the sponge another bit of silk. By withdrawing the bougie through the stomach the stone was dislodged, and with the finger hooked out and removed. The various incisions were then closed. The patient had an uneventful convalescence of two weeks. For a few days he was fed by the rectum. Then he was successively given water, crushed ice, milk, and solids. In ten days he was up and out of doors. Two days later he had a slight chill, and the temperature rose to 102.5°. An examination of the blood disclosed the existence of a moderate leukocytosis, but no malarial parasites could be found. In the course of a few days more, dulness on percussion became evident at the base of the left chest. The introduction of an aspirating-needle disclosed the presence of pus, and a diagnosis of mediastinal abscess was made. A portion

of the eighth rib was excised, and a large pus-cavity, which appeared to be behind, and to have no communication with the pleural cavity, was evacuated. No bacteria were found in the pus. The patient speedily recovered, and was soon dismissed. He gave a history of always having had some difficulty in deglutition. Six years previously a piece of meat had lodged in the esophagus for thirty hours.

The Relation of the Posterior Root to the Posterior Horn in the Medulla and Cord.—As a result of a careful study, TOOTH (*Journal of Physiology*, December, 1892, p. 773) concludes that the posterior roots are the only points of entrance of sensory or, more broadly, centripetal impressions into the spinal nervous system. In the medulla oblongata the fifth nerve is the great sensory nerve, corresponding to an unknown number of sensory roots. Its so-called ascending root descends in the medulla and cord to the level of the second cervical root, sending fibers all the way to and through the accompanying substantia gelatinosa. The entering posterior root fibers may be divided anatomically into three groups: (1) a mesial group, entering the postero-lateral column, distributed in part to the postero-median column and in part to the base of the horn, to be further distributed to the posterior vesicular column and anterior horns; (2) a middle group, distributed mainly, if not entirely, to the substantia gelatinosa and its plexus; (3) a lateral group, distributed to the border zone. The ascending root of the fifth nerve, in its anatomic relations to the substantia gelatinosa, corresponds to the middle group of a number of posterior roots. At the level of the second cervical root the ascending root and the spinal posterior root are seen together, the former passing into the substantia gelatinosa, the latter round it to the substantia spongiosa. No experimental method of discriminating the various forms of sensory impressions that enter by the groups of fibers named has yet been devised. Certain tracts degenerate after section of the posterior roots, but experimental lesions of these tracts themselves give most uncertain results as regards any of the forms of sensation. The substantia gelatinosa of the cord is continuous with and of the same structure as that of the medulla. A study of the structure of the substantia gelatinosa favors the view that it is nervous, of actual functional value, and not an embryonic remnant. It is possible that its cells stand in functional relation to the entering fibers, so that from this point of view the substantia gelatinosa may be looked upon as one long sensory nucleus extending from the chief nucleus of the fifth (which is a specially developed part of it) to the lower sacral region of the cord. These conclusions are in accordance with the views of Schiff and others, viz., that the gray matter is the path by which sensory impressions reach the higher regions of the nervous system. This paper attempts to limit this path to the substantia gelatinosa and its plexus. How the stimulus passes up to the cerebrum, whether it straggles up cell by cell or by the intervening fibers of the plexus, is at present unknown.

External Esophagotomy for the Removal of a Foreign Body from the Esophagus.—DUFFAU (*Journal de Médecine de Bordeaux*, No. 47, 1892, p. 522) has reported the case of a man, twenty-one years old, who, on attempting to

run, inadvertently swallowed a large stone that he happened to have in his mouth. Little could be seen externally or learned from exploration of the mouth. On palpation, however, a sense of resistance could be appreciated at the level of the sternal notch, and the passage of a bulbous bougie encountered an impassable obstruction at a corresponding point in the esophagus. Deglutition was extremely difficult; only fluids in small quantity could be swallowed. All endeavors to dislodge and remove the body failed. Better results were not had on the following day, after the patient had rested. It was thus finally determined to perform external esophagotomy. An incision, almost four inches long, was made in the course of the anterior margin of the left sterno-mastoid muscle and extending to the level of the sternum. By careful dissection the esophagus was reached and incised. After some difficulty the stone, which was quite firmly impacted in the esophagus, was removed. The field of operation was rendered aseptic and the margins of the incised mucous membrane were united, the muscular coat not being further disturbed. The sheath of the muscle was closed by suture. The bottom of the wound was now packed with gauze, which was brought out at the inferior extremity of the incision. The remainder of the wound was closed by catgut sutures. After the operation the patient was nourished through the medium of a tube. There were no complications. Nine days after the operation the patient was able to take liquids in the usual way, without any escape from the esophageal wound. In a short time recovery was perfect.

Noma in an Adult.—KÖSTER (*Centralbl. f. Chirurgie*, 1892, No. 45, p. 940) has reported the case of a woman, forty-four years old, who was said to have had a left-sided hemorrhagic pleurisy, from which she recovered, but never afterward felt perfectly well, suffering considerably from dyspnea. The hygienic surroundings were poor; the woman was compelled to work hard, and received insufficient food. A swelling appeared upon the inner surface of the left cheek, and in the course of two weeks the entire cheek was swollen. A few days later a bloody, offensive discharge from the mouth set in. The cheek became intensely red, then black, and finally ulcerous. The edematous swelling extended to the whole of the left side of the face. There was slight elevation of temperature. The urine contained no albumin. The gangrene of the cheek progressed until the cheek was perforated. For a year there had been noticed a tumor in the left hypochondrium, at times larger, at times smaller. The spleen was found to be enlarged. There were 3,200,000 red and 20,000 colorless blood-corpuscles to the cubic millimeter. The condition of the woman became progressively worse, and she died in collapse. At the post-mortem examination, in addition to the gangrene of the left cheek and the adjacent gum, the left pleural cavity was found to be obliterated by adhesions, the spleen enlarged, and its capsule greatly thickened, and the kidneys large and white.

A Gas-generating Bacterium in Urine.—SCHOW (*Centralbl. f. Bakteriologie u. Parasitenk.*, xii, 21, p. 745) has isolated from the urine of a case of compression-myelitis, attended with incontinence of urine and cystitis, a

short, plump, motile bacillus, capable of generating carbon dioxide. The urine had been noticed to have a sulfurous odor. In most of the cultures of the organism, for which the name *cocco-bacillus aërogenes vesicae* is proposed, a peculiar aromatic odor was developed. Cystitis was produced in a dog by injecting an infusion of the culture into the bladder, and applying a ligature to the urethra for a few hours.

THERAPEUTIC NOTES.

For Purulent Cystitis.—

R.—Iodoform. subtil. pulv. ʒiv.
Mucilag. acaciae f ʒjss.
Glycerini pur. f ʒvj.
Aquaë destil. ad. f ʒv.—M.

S.—After irrigating the bladder with a solution of lactic acid, 1:400, five drams of the emulsion indicated are carefully injected and permitted to remain for fifteen minutes. The procedure is repeated during several weeks at intervals of several days.—PHILIPPOFF, *Deutsche med. Ztg.*, No. 93; *Wiener med. Presse*, No. 51.

Analgen, or ortho-ethoxy-ana-monobenzoylamidochinolin ($C_9H_5OC_2H_5NH.COC_6H_5N$) is the name given to a white, tasteless compound that is almost insoluble in water, soluble with difficulty in cold alcohol, but more readily in hot alcohol and in dilute acids, and that melts at 406.4° F. The agent has been shown to be non-toxic to dogs. It has been employed in doses of from seven and a half to thirty grains as an analgesic and antineuralgic and as an antipyretic. The reduction of temperature to which it gives rise is attended with sweating.—*Therapeutische Monatshefte*, vi, 12, p. 666.

For Sycosis.—

R.—Acid. salicylic. gr. x.
Chrysarobin. }
Ichthyol. } aa gr. xxiv.
Vaselin. vel lanolin. ʒj.—M.

Ft. unguent.

S.—Apply topically with friction and cover with a thin sheet of rubber cloth.

QUINQUAUD, *L'Union Méd.*, No. 144.

Painful Hemorrhoids may, after being washed with a weak solution of mercuric chlorid, with advantage be anointed with the following ointment:

R.—Lanolin. ʒv.
Vaselin. ʒij.
Aquaë destil. ʒiij.—M.

The ointment may also be incorporated in a tampon, which can be introduced into the rectum.

Corr.-bl. f. *Schw. Aerzte*, xxiii, 2.

Puff-ball (*Lycoperdon giganteum*) as a Hemostatic.—SMITH (*Edinburgh Medical Journal*, No. 451, p. 639) reports the successful employment of puff-ball (*Lycoperdon giganteum*) in the control of hemorrhage in accessible situations. The puff-ball is cut into thin slices, and applied directly to the bleeding point or surface.

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LEUKEMIA AND PSEUDO-LEUKEMIA.

NOT a little attention has been devoted during the past few years to the study of the relations of pseudo-leukemia, leukemia, and allied affections, and it would seem that we have arrived at somewhat clearer notions of their mutual interdependence. The close relation of leukemia and pseudo-leukemia is at once evident from the identity, with the exception of the condition of the blood, of the clinical features and from the fact that the pathologic alterations of the blood-forming organs are indistinguishable; yet the single fact of the presence of marked leukocytosis in leukemia has served to maintain this as a separate disease. H. C. WOOD,¹ many years ago, ventured the suggestion that leukocytosis is a feature of too little importance to distinguish one disease from another similar in other respects, but his opinion has until recently found few determined supporters. The reason of this is doubtless to be found in the very striking and unique appearance presented upon microscopic examination of the blood, and the fact that knowledge of the varied conditions that may induce increased numbers of leukocytes in the blood was meager in the day of WOOD's announcement. We are more

fortunate at the present time in recognizing many causes that lead to leukocytosis, albeit of less degree than that seen in leukemia, and this knowledge may aid us in a better conception of the nature of these affections and to divest ourselves of the undue influence with which this condition has, fetish-like, controlled our beliefs.

Beginning with WOOD, a number of observers (MOSLER,¹ FLEISCHER and PENZOLDT,² WESTPHAL,³ SENATOR,⁴ EBSTEIN,⁵ VON JAKSCH,⁶ and more recently RENDU,⁷ CROCQ,⁸ TOROJE,⁹ and PALMA¹⁰), have recorded cases of Hodgkin's disease that terminated in leukemia. Some of these authors are inclined to regard the increase in the number of colorless blood-corpuscles that occurs at the end of these cases as either a terminal leukocytosis, such as may occur in other diseases (CROCQ), or as an acute leukemia supervening upon a previous pseudo-leukemia (EBSTEIN); but the degree of leukocytosis observed in such cases has far exceeded that which occurs at the termination of other diseases, and the great similarity of the two diseases in all other features would disincline an unbiased mind from accepting the idea of the supervention of a second disease upon the first.

It is further of interest to note that cases of undoubted leukemia have been known to present intervals of freedom from a leukemic condition of the blood, as in the cases of BARR,¹¹ MACKENZIE,¹² and TOULMIN.¹³ If, then, leukocytosis were sufficiently important to justify the view of EBSTEIN and his followers, should we expect to find this symptom absent even for the briefest period during the continuance of the disease? The opinion expressed by others that in the clinical course of true leukemia the anatomic changes in the blood-forming organs may precede definite alterations in the blood by considerable lengths of time, is but a confirmation of the position we maintain, that the

¹ Mosler: Virchow's Archiv, Bd. cxiv.

² Fleischer and Pensoldt: Deut. Archiv für klin. Med., 1880, Bd. xxvi.

³ Westphal: Inaug. Diss., Greifswald, 1887.

⁴ Senator: Berlin. klin. Wochenschr., 1882, No. 35.

⁵ Ebstein: Deut. Archiv für klin. Med., 1888, Bd. xlv.

⁶ R. von Jaksch: Wiener klin. Wochenschr., 1889, Nos. 22 and 23.

⁷ Rendu: L'Union Médicale, June 21, 1892.

⁸ Crocq: Bruxelles Journ. de Méd., December 20, 1891.

⁹ Toroje: Deut. med. Wochenschr., April 21, 1892.

¹⁰ Palma: Deut. med. Wochenschr., September 21, 1892.

¹¹ Barr: London Lancet, February 21, 1891.

¹² Mackenzie: Med. Press and Circ., August 12th.

¹³ Toulmin: Johns Hopkins Hospital Bulletin, 1891.

¹ H. C. Wood: Phila. Med. Times, Dec. 15, 1870.

leukocytosis of leukemia is a symptom of too little import to warrant the maintenance of a separate and distinct disease upon this alone.

The opinion here expressed receives further corroboration by a consideration of two other allied affections recently described: the *splenomegalie primitive* of DEBOVE and BRUHL,¹ and the *anemia infantum pseudo-leukemica* of VON JAKSCH.² The former is a disease in which there occurs an apparently idiopathic enlargement of the spleen, with anemia and debility, and in which the characters of the splenic enlargement coincide entirely with those of leukemia or pseudo-leukemia. There seems, therefore, no sufficient reason for regarding this other than as Hodgkin's disease of splenic type. The infantile pseudo-leukemia of v. JAKSCH, on the other hand, approaches more nearly to the features of leukemia, with the distinctions that the liver enlarges less, the leukocytosis is less profound, and connective-tissue hyperplasia in the spleen is relatively more marked than in leukemia.

In connection with the present discussion, then, we may group these several diseases together as a sequence, beginning with the primary splenomegaly, in which the spleen alone seems involved; then Hodgkin's disease, with implication of the lymphatic glands as well; next v. JAKSCH's pseudo-leukemia, with further addition of leukocytosis and myelogenous involvement; and finally leukemia, in which all of these changes occur to the maximum degree. Viewed in this way it does not seem unreasonable to suppose that we have in all of these cases to do with more or less identical pathologic processes, the degree alone of abnormality varying in the different forms, and being somewhat differently disposed; and this is all the more probable as cases of Hodgkin's disease, as well as primary splenomegaly (CROCC), have been known to become leukemic, and cases of leukemia, temporarily at least, pseudo-leukemic. If, however, it be urged that the different histology of v. JAKSCH's pseudo-leukemia (the great connective-tissue hyperplasia and absence of lymphatic proliferation) excludes this from the present discussion, have we not, on the other hand, a striking example here of the possibility of extreme leukocytosis (almost as great as in the most pronounced leukemias) aside from leukemia itself? and would not this render increase of leukocytes

(properly, as we think) an unimportant symptom, as far at least as establishing a separate disease by its occurrence is concerned?

EICHHORST¹ sought to establish for leukemia an independence by noting the constant occurrence of excess of uric acid in the urine in this disease, and the absence of the symptom in pseudo-leukemia, but the investigations of HORBACZEWSKI² and WRIGHT³ have undoubtedly proved that the excessive uric acid in the urine is merely the result of excess of leukocytes and their destruction in the blood.

We cannot hesitate, therefore, to range ourselves with WOOD,⁴ JACCOUD,⁵ HENRY,⁶ ORTNER,⁷ TISSIER,⁸ and those others who deny that these affections are essentially separate, but are convinced that they are expressions of the same underlying conditions, whether these be constant or variable.

There is, indeed, no little evidence to incline us to the view that these diseases, pseudo-leukemia and leukemia, are both, after all, but expressions of various pathologic states, whose visible symptoms and gross morbid changes are similar. Thus, in the case of leukemia there is apparently wide difference between the ordinary chronic form of the disease and the interesting cases of acute type, particularly such as those of OBRASZTOW,⁹ in which infection and contagion were clearly shown; and no less impressive are the studies of pseudo-leukemia by WAETZOLDT,¹⁰ ASKANACY,¹¹ and BRENTANO and TANGL.¹² These observers showed clearly that the enlarged glands of cases of pseudo-leukemia contained tubercle-bacilli, and in one case at least were infective for guinea-pigs. Whether or not we accept as conclusive two of these cases, about which the doubt might be entertained that there was secondary tuberculous infection of the enlarged glands, there can be no question of the third, that of ASKA-

¹ Eichhorst: Text-book of Medicine; article "Pseudo-leukemia."

² Horbaczewski: Au den Sitzungsberichten der k.-k. Akademie der Wissensch. in Wien, Math.-naturwiss. Classe, Bd. xcviil, Abtheil 3. 1889.

³ E. A. Wright: London Lancet, February 27 et seq., 1892.

⁴ Wood: Loc. cit.

⁵ Jacoud: Leçons de Clinique Méd. de l'Hôp. Lariboisière, 1873.

⁶ Henry: Universal Annual of the Med. Sciences; article "Leukemia."

⁷ Ortner: Wiener klin. Wochenschr., November 27, 1890.

⁸ Tissier: Gaz. des Hôpitaux, July 23, 1892.

⁹ Obraszow: Deut. med. Wochenschr., December 17, 1890.

¹⁰ Waetzoldt: Centralbl. für klin. Med., 1890, No. 45.

¹¹ Askanacy: Beitr. z. allg. Path. und path. Anat., Bd. iii.

¹² Brentano and Tangl: Deut. med. Woch., April 23, 1891.

¹ Bruhl: Arch. Gén. de Méd., June and August, 1891.

² R. von Jaksch: Loc. cit., et Prag. med. Wochenschr., 1890, Nos. 31-33.

NACY, and we are forced to believe that the manifestations of pseudo-leukemia may sometimes result from lymph-gland tuberculosis. In another carefully studied case (ROUX and LANNOIS¹) the glands contained the staphylococcus pyogenes aureus, and the glandular proliferation seemed dependent on this microorganism. Finally, the relation of lymphosarcomatosis, as in the cases of ORTNER² and of PALMA,³ to leukemia and pseudo-leukemia, and the striking difference in the spread of this new-growth from that of the ordinary lymphomatous growths of these diseases, are facts suggestive of a varied pathology.

A careful consideration of the present knowledge concerning these diseases would indicate, then, that too much stress has been laid upon the occurrence of leukocytosis, and that we are warranted in accepting JACCOUD's⁴ grouping of both under the term *diathèse lymphogène*, whether we believe the cause of such diathesis to be a constant or a variable one.

THE TAX ON ALCOHOL.

OF all forms of injustice, fraud, and extortion, the robbery of the sick is perhaps the meanest. Physicians should, therefore, at once and in no uncertain manner make their influence felt against the bill (H. R. 9829) introduced by Mr. SCOTT and now pending in Congress, to increase the tax on distilled spirits from 90 cents to \$1.25 per proof-gallon. Its aspects as a revenue measure do not come within our province to discuss; if they did, we could easily expose its fallacy and shortsightedness. What concerns THE NEWS as a medical journal is that the passage of the bill will greatly increase the cost of all drugs and pharmaceutical preparations into the manufacture of which alcohol enters directly or indirectly; and this means almost all of the preparations used in medicine. It is alleged, with great plausibility, that the bill is framed solely in the interests of that gigantic conspiracy popularly known as the Whiskey Trust; the inevitable economic result being to immediately and enormously increase the actual and prospective revenues of the Trust by the advance of 35 cents per gallon in the price of all the stock at present in its possession, bonded or otherwise; and further to increase the disadvantages im-

posed upon the lesser capital of distillers who still remain "out" of the Trust; thus helping to crush out the last vestige of competition.

In circulars issued by the Philadelphia Drug Exchange, the Drug-Trade Section of the New York Board of Trade and Transportation, and the National Wholesale Druggists' Association, the methods of the Trust are exposed; and it is shown that so far from increasing the tax on all distilled spirits, Congress should provide for the exemption of alcohol used in the arts or manufactures from even the present tax, as is now done in France and England, and thus enable our manufacturers to meet foreign competitors on more nearly equal terms. Furthermore, it is wisely suggested that a just measure of relief would be the reduction of customs duty upon alcohol from the present prohibitory figure of \$2.50 per proof-gallon (equal to \$4.70 per wine-gallon) to a figure slightly in excess of the present internal revenue tax, say to \$1.00 per proof gallon, as there would then be a limit to the exactions of the Trust; for excessive increase of price would invite foreign competition. Even at this proposed reduction the customs duty would afford a protection of 18½ cents per wine-gallon—"surely sufficient for an article costing 25 cents to produce."

It is greatly to be hoped that the Trust will be found to have overshot its mark; and that not only will the great injustice it proposes not be consummated, but that as a result of the interest aroused Congress will adopt the suggestion of affording relief by exemptions and by reduction of tariff, thus putting an end to the inordinate extortion now practised and sought to be increased.

HYDROGEN DIOXID.

It is now thirty-five years since BENJAMIN WARD RICHARDSON introduced into practical medicine the use of aqueous and ethereal solutions of hydrogen dioxid (H₂O₂). It is not much more than five years since various American observers have been singing the praises of the agent, with utter disregard of the observations of the man who introduced it and pointed out all its applications and limitations. One thing in particular he showed as the result of prolonged experimentation; namely, that it was impossible to prepare a stable solution in water of more than ten-volume strength. If solutions of greater strength were attempted, it was necessary to render them too acid, and as soon

¹ Roux and Lannois: Rev. de Méd., December, 1890.

² Ortner: Loc. cit.

³ Palma: Loc. cit.

⁴ Jaccoud: Loc. cit.

as uncorked they began to lose oxygen; rapidly running down to almost nothing more than H_2O , *i. e.*, hydrogen monoxid—water. Nevertheless, American manufacturers have refused to learn from the great authority of Richardson, and they continue to advertise solutions of more than ten-volume strength. Analyses published in *THE MEDICAL NEWS* prove the incorrectness of the advertised claims, and the experience of practitioners (excepting those who have by this time become well-recognized as manufacturers' reporting agents) shows that few of the preparations now in the American market can be depended upon; their reliability being, as a rule, in inverse ratio to their respective claims. A moderate acidity is necessary to any stable preparation, even of ten-volume strength; but this is so slight that except for subcutaneous injection it may be disregarded. The preparation now most often supplied on prescription in this city, however, is so highly acid that it gives pain if used, and does harm, for instance, in the throat, especially in children. But in the treatment of diphtheria, of scarlatina, and of various forms of sore throat, hydrogen dioxid is invaluable; and it is repeated experience of the harmfulness of the preparation alluded to that leads to the writing of these lines. If no other preparation can be obtained, the acid should be carefully neutralized with ammonia water or sodium bicarbonate, at the time of using. The subject is an important one, and every physician should personally study it. Two facts should be borne in mind; no preparation that undiluted gives pain should be employed; no preparation claiming more than ten-volume strength can be entirely reliable. As even ten-volume solutions must often be diluted, the necessity for stronger ones is not apparent.

We have for many years used a preparation made in London according to Richardson's directions, but the necessity for special importation renders it unduly expensive. American chemists can do as well as English chemists, if they choose, and they ought to be made to choose.

EDITORIAL COMMENTS.

Physicians as Pharmacists.—It is an admitted axiom in mathematics that "the greater includes the less." It is no less true in all other sciences. The study of pharmacy does not include all the knowledge necessary for the practice of medicine, but the study of medicine does include all the knowledge necessary for the practice of pharmacy, in so far as the protection of the public

against danger of mistake is concerned. The manipulative skill that comes by practice is not difficult to obtain, and many physicians, especially country doctors, possess this in a high degree.

For this reason the proposition to repeal Section 11 of an act entitled "An Act to regulate the practice of pharmacy, etc.," now pending in the Pennsylvania Legislature, is not only unwise and unjust, but ludicrous. The section in question permits any graduate in medicine, of not less than three years' experience in his profession, and legally qualified to practise medicine in Pennsylvania, to act as a pharmacist without special examination. This wise permission should not be repealed. Why a man who can be trusted to prescribe poisons cannot be permitted to dispense them on others' prescriptions is difficult to comprehend. It is like prohibiting a general of the army from serving as a private. He can order the movements of troops but must not handle a musket. Medical men in Pennsylvania should not permit such an absurdity to disgrace our statute books. Somebody, however, is interested in pushing it, and it will probably be necessary to send formal protests, and perhaps delegations to Harrisburg to prevent the attempt from being successful.

"The American Family Physician's Company."—There have been few more ludicrous attempts to commercialize medical practice than the unblushing attempt to establish in Cincinnati, Ohio, a company to act as go-between, promoter, advertiser, and business manager of the physician in his relations with the patient. These enterprising gentlemen proposed to provide "an absolute and sure method of providing a physician of the highest standing for sickness and accident to any and all members of the family." All one had to do was to "go to the nearest telephone," touch the button—and the company did the rest. The scale of prices for every sort of service was laid out with most commendable accuracy. Unluckily, however, for the medical tradesmen, the Academy of Medicine and the Cincinnati Medical Society said that "a physician cannot be connected with this company and remain a member in good standing of the medical societies." Now, let those "physicians and surgeons of the highest professional standing" reorganize themselves, as our St. Louis friend would say, on "broad-gauge principles," and institute a telephone or call-bell service, similar to that ingenious one in use in the hotels, whereby the guest can have appear at his door anything from a glass of fizz-water to a human being with any peculiar capacity desired. In this way the pointer could be turned to any one of the thousand symptoms of disease, belly-ache, acute vaginismus, paralysis, albuminuria, or hysteria—and lo! there would at once be whisked to one's relief the accurate and infallible machine, human or not human, Hahnemannian, electric or allopathic, the exact drug or potion, all prepared and ready to be shot at or into one, exactly *quantum suf.* and *pro re nata*, to a dot! "All accounts must be settled at the office."

Medical College Consolidation.—The action of the authorities of Rush Medical College and of the College of Physicians and Surgeons, of Chicago, in offering to resign their various positions unconditionally and to sur-

render their property to the liberally-endowed new Chicago University, must be viewed as most significant. With this great school in the West, with the fine plant and the large resources of the Johns Hopkins School at Baltimore, with the consolidation of two of the schools in New York, Philadelphia must look to her laurels, lest she be left in the race. Who shall say that good might not result if the dream of Provost Pepper were realized, that medical students in Philadelphia could, at their option, attend lectures at one or another of the reputable and high-grade schools of the city. The demand of the hour is for higher medical education, and this implies preliminary qualifications, protracted courses of study, unselfishness of administration, and liberal endowment. There is needed a healthful reaction against the petty rivalries and ignoble strifes of institutions supposably working for a common noble end. If the supposed object—the highest and best medical education—were the real and primary object we should hear more of such attempts to gather the weak, selfish, and warring forces into a unity whereby progress in medicine would be admirably furthered, and a silly rivalry be no more the butt of ridicule and public scorn.

Tuberculosis and Life-insurance—It is a very regrettable fact that the vast amount of data in reference to the problems of heredity and preventive medicine that might be elicited from the vital statistics of life-insurance companies is not utilized; and still more regrettable is it that the members of the medical profession connected with these companies do not make better use of their positions and powers to so shape their examinations and records as to throw still greater light on these problems. It would, perhaps, be somewhat of a thankless task on their part, but what downright good work in the world receives proper gratitude and reward? Dr. Lyon recently read before the Hunterian Society, of London, a thoughtful essay on "Phthisis in Relation to Life-insurance," in which we are somewhat surprised to find that medical records contain no adequate data for determining the question of pulmonary tuberculosis in relation to life-insurance, and that the existing theories are founded upon insufficient data. A thorough-going examination of the statistics of insurance offices is urged as highly necessary.

The Medical Education of Missionaries.—The International Medical Missionary Society has asked the New York Board of Regents to empower the Society to grant its students the degree of M.D. after such medical education as it shall deem sufficient to fit them for their work. It seeks to supply a medical course and degree at a less expense than the regular colleges. A less expensive course of study (at the low-tuition rates of our colleges) means, of course, a less thorough course and a more poorly-prepared physician. Worse-qualified physicians and a multiplication of third-rate or tenth-rate medical colleges are things far from desirable. It is difficult to understand why the physician plus the missionary, separated, as he will be, from the aids and supports of civilization, should be less thoroughly equipped for his medical work than the physician who, without theology, practices with physicians and drug-stores, and instrument-makers all about him.

A Cheap Advertisement.—All it costs to have portrait and "biography" inserted in *America Illustrated* is \$16.75, and one can write his own puff! The portraits, judging from samples forwarded, are really well done, and we cordially commend the scheme to all eligible "medical men" that find pleasure or profit in being thus advertised. If in enterprises of this character like sketches were printed, concerning those who did not "subscribe" or pay for "engraving," as those who do pay, nothing could be said against any one concerned; it is the restriction of "notice" to those who give *quid pro quo* that makes it advertising, and as such to be avoided by self-respecting physicians.

Medical Students and Medical Sectarianism.—From the forthcoming report of the Bureau of Education Dr. Holmes (*Journ. Amer. Med. Assoc.*, January 14, 1893) epitomizes the statistics of medical education in the United States. In 1890 there were 13,044 students at the regular schools, against 1128 at the homeopathic, and 661 at the eclectic schools. The number of homeopathic students, compared with that of former years back to 1880, is decreasing; the number of the eclectics is slightly increasing, whilst the number of regulars has enormously increased—about 2300—within three years.

Speech Without a Larynx and Without Use of the Lungs.—We are informed by Dr. J. Solis-Cohen that the patient from whom he removed the larynx last April, and whose trachea has been continuously cut off from intercommunication with the mouth, has learned, by practice, to so draw together his palatine folds as to make them subserve the purpose of phonal reeds, which he sets into vibration with the air in his mouth and pharynx. He can thus articulate words and short sentences quite audibly, and at times loudly enough to be distinguished in an adjoining apartment. The voice is phonal, and not a mere whisper.

SELECTION.

MEDICAL EDUCATION.

In 1880, in each 100,000 inhabitants in France, there were 11 students of medicine and 14 students of law. At about the same time, in Germany, there were 8 students of medicine and 11 students of law to the same unit of population. This changed so that in 1888, France had 17 students of medicine and 14 students of law, and Germany had 18 students of medicine and 13 students of law to each 100,000 population.

In 1881, in the United States, there were 25 students of medicine, 6 students of law, and 9 students of theology to each 100,000 inhabitants, while in 1890 there were 24 students of medicine, 7 students of law, and 11 students of theology in the same unit of population.

Relatively a smaller number of medical students have the bachelor's degree than in 1880, though the education of the average medical student is superior to the education of the average medical student ten years ago.

Last summer, many of the college journals gave in the June number the statistics of the graduating class. I selected out seven such compilations and noticed an astonishing series of figures under the caption "Prospec-

tive Calling." Almost 40 per cent. of the June graduates were put down for law, about the same number for theology, while only about 5 per cent. had selected medicine for their future study.

This shows evidently that medicine is not attractive to the college-bred man.

But if medicine is sought by the educated German and is neglected by the educated American, may it not be the fault of the medical schools themselves? Largely I believe it is. This has happened from many and from widely separated causes. Medical education has not been controlled by educators, but by clinicians. The antique methods of the Revolutionary period prevail in the great majority of medical schools to-day. Even in those medical schools that are most intimately connected with State or private universities, other rules and other methods than those of the literary and technological departments prevail. In the report which furnishes the material for this article, we are astonished to find that in one of our university medical schools the course of lectures is so arranged that each student hears every lecture repeated the second year of his attendance and then passes his examination and graduates. Can any educated man endure this, in this last decade of the nineteenth century! The fact is apparent to any student that medical schools are run for the good and profit if not for the glory of the professors. These men want quick returns, and they adapt their instruction to the unevolved mental maws of the students that come in the greatest numbers. Such pap the college-bred man does not relish. To such instruction the university teachers do not recommend men for post-graduate work. To such instruction the American university too often gives its name though withholding its support.

In conclusion, let me make the following deductions:

1. The average course of study in the United States is still less than three years—*i. e.*, eighteen months.
2. The antiquated method of repetition still prevails in the majority of medical schools.
3. The number of students of medicine is absolutely increasing, but (in relation to the population) relatively diminishing. The homeopathic and eclectic schools are hardly holding their own.
4. The education of the average medical student is superior to that of ten years ago, but the ratio of matriculates having degrees in science or art is actually diminishing even in the richest, best located, and only endowed medical schools.
5. The medical department is, so far as we know, neglected by every university in the United States; it is farmed out or left to shift for itself on half rations, or in the best instances, treated from an educational standpoint in an exceptional manner.
6. Medicine is neglected by the benevolent and by the State. From the former it has received almost nothing, and from the latter not a tithe of what has been lavished on technological schools, and this in spite of the fact that the State and all benevolent institutions have put a heavy task of gratuitous and often compulsory service on the medical profession.
7. The medical schools are wasting their substance by keeping their doors shut half the year, and they are degrading the profession by allowing uneducated men to matriculate and uncultured men to graduate.

8. The laws which allow the diploma to become a license to practise, but the short-term-no-requirement schools in a position to dictate to the schools that offer a medical education in place of a degree.—BAYARD HOLMES (*Journal of American Medical Association*, January 14, 1893).

NEWS ITEMS.

The U. S. Marine-Hospital Service.—A board of officers will be convened at Washington, March 20, 1893, for the purpose of examining applicants for admission to the grade of Assistant Surgeon in the U. S. Marine-Hospital Service.

For information or invitation to appear before the board of examiners, the Supervising Surgeon-General, Dr. Walter Wyman, Washington, D. C., should be communicated with.

The Section on Laryngology and Rhinology of the Pan-American Medical Congress.—It is announced, is now thoroughly organized, with secretaries in all the countries of South America, as well as in the United States and Canada. Dr. J. Maron y Alonso, of Las Vegas, N. M., is the Spanish-speaking secretary, and Dr. T. Morris Murray, of Washington, D. C., is the English-speaking secretary, with whom physicians interested in this section are invited to correspond.

Ohio State Association of Railway Surgeons.—An invitation is extended to all railway surgeons of the State of Ohio to attend a meeting to be held on March 17th, at 9 A.M., in the amphitheater of the Ohio Medical University, at Columbus, for the purpose of organizing a State Association. Intending participants are requested to send their names to the secretary, Dr. C. H. Merz, Sandusky, Ohio.

The Cholera in Marseilles.—Dr. Robin, of Paris, has written the New York *Herald* that the epidemic in Marseilles, about the exact nature of which there has been considerable doubt, is in his opinion genuine cholera, but that there is no immediate danger of a spread of the disease from this point as an infecting center.

Addition.—By an inadvertence the name of Dr. Middleton Michel, of Charleston, was omitted from the list of members elected at the last meeting of the Association of American Anatomists, as published in *THE NEWS* of January 28, 1893, p. 109.

The American Practitioner and News is to be congratulated upon its greatly improved appearance. Its dignity and usefulness would be still further increased by omitting advertisements from its reading-columns.

Prof. Otto Kahler, the occupant of the chair of clinical medicine, associated with the second medical clinic in the University of Vienna, died January 25th, forty-four years old, of carcinoma of the tongue.

The Missouri Valley Medical Society will hold its next meeting at St. Joseph, Mo., March 16th. A cordial invitation is extended to the members of the profession to attend.